DOCUMENT RESUME

ED 379 354 TM 022 749

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TITLE The Discontinuity of Human Existence, Part II: The General and The Specific Theories of Discontinuity. No. 51.
INSTITUTION Lund Univ. (Sweden). Cognitive Science Research.
REPORT NO ISSN-0281-9864
PUB DATE 94
NOTE 47p.
PUB TYPE Reports - Evaluative/Feasibility (142)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Cognitive Processes; Foreign Countries; *Individual Development; *Life Events; *Objectives; *Theories
IDENTIFIERS *Discontinuity; Self Reference (Psychology); Sweden

ABSTRACT

This is the second paper in a series of three, the objective of which is to describe the fundamental discontinuities of human existence. Self-reference is explored in the first section of this paper, arguing that neither time-space nor developmental dimensions are adequate to explain the problem of self-reference. It is argued that self-reference might indeed be an uncognizable degree of freedom that governs human existence. The founding propositions of the discontinuity theory then state that human existence subexists as difference, time-space, development, and self-reference. The second section maintains that human existence can be modeled as discursive strings encompassing a context-agent enacting an agent enacting an objective, where the objective itself can be an agent enacting an objective, and so on. The general theory of discontinuity is described in section 2. Section 3 encompasses the specific theory of discontinuity that builds on the heritage of classic theories explored in part 1. The theory encompasses three different forms of development: (1) canalization, which includes perspectivizing; (2) correlation, which includes systematizing; and (3) combination, which encompasses organizing. Nineteen figures illustrate the discussion. (Contains 18 references.) (SLD)

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The Discontinuity of Human Existence

Part II.
The General and the Specific Theories of Discontinuity

Ole Elstrup Rasmussen

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1994 **No.51**

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Abstract

This is the second article in a series of three, the objective of which is to describe the fundamental discontinuities of human existence.

In part I: *The Fundamental Concepts of Human Existence and the Relation between the Singular and the Super Singular*, it was concluded, among other things, that the theories analyzed had a number of fundamental concepts of development in common: *canalization* that encompasses transference of something from one to another, *correlation* that encompasses reciprocity which is the basis of generalization and *combination* that encompasses the production of the new. It was also emphasized that the classic theories pointed to the problem of *self-reference*.

In the first section of this article, the problem of self-reference is outlined at a high level of generalization. It is argued that the structure-oriented philosophers, Kant for example, try to solve the problem of self-reference in the *time-space* dimension, while the process-oriented philosophers, Hegel for example, try to solve the problem in the *developmental* dimension, and that both trends claim that *difference* is the foundation of human existence and, by that, self-reference. It is concluded that the two trends cannot solve the self-reference problem.

Furthermore, as the self-reference problem cannot be solved, it is argued that self-reference might equally well be claimed as a prerequisite, that is, an uncognizable degree of freedom which governs human existence. Thus, the founding propositions of the discontinuity theory state that human existence subsists as difference, time-space, development and self-reference.

In the second section, it is primarily claimed that human existence can be modelled as discursive strings, the general form of which is .....(Aa(Aao))..... The discursive string encompasses a context-agent enacting an agent enacting an objective, where the objective itself can be an agent enacting an objective, etc.

The general theory of discontinuity modelled, among other things, by means of catastrophe theory, is described in section two. The general discontinuity theory models the *implicate order* of human existence determined by the degrees of freedom: difference, time-space, development and self-reference.

Within the general theory it is shown that the founding implicate order of the .....(Aa(Aao)).....string can be conceptualized by the agent concepts: attention, positioning and intention, and the concepts of objective: designated difference, category distance and category orientation.

The third section encompasses the specific theory of discontinuity which builds on the heritage of the classic theories analyzed in part I. The theory encompasses three different forms of development: *canalization* which includes the process of *perspectivizing*, *correlation* which includes the process of *systematizing*, and *combination* which encompasses the process of *organizing*. Because of the three developmental processes, the person, for example, obtains the *qualifications* to put his existence in *order* in a *perspective* manner and acquires the *competence* to make *sense* of his existence in a *perspective* manner.

The specific theory of discontinuity also suggests a solution to the problem of the relation between the singular and the super singular, as it claims that the singular and the super singular are but different expressions of the same fundamental structures and processes of human existence. There is no relation between the minor and the major as they are but different levels of generalization.

Preliminary Remarks

This article is the second in a series of three.

The first article: *The Fundamental Concepts of Human Existence and the Relation between the Singular and the Super Singular*, includes two sections.

The first section comprises an analysis of entrepreneurship. My reason for starting with entrepreneurship is twofold. The entrepreneurial sciences represent a tradition, the subject matter of which is change, and entrepreneurship encompasses the relation between the singular and the super singular, a problem that has frustrated the cognition of human existence.

The analysis of some classic theories of entrepreneurship shows that, given a sufficient level of generalization, a small number of concepts are enough to model entrepreneurship within economics. The analysis, however, shows that economics cannot describe entrepreneurship completely. Psychology must be included, but the analysis reveals that current psychological research is unable to solve the problems of entrepreneurship. Finally, the analysis concludes that an unclarified relation between the super singular and the singular constitutes an obstacle for the modelling of entrepreneurship.

In the second section of the first article, some classic theories of human existence are analyzed in order to examine whether it is possible to find answers to the questions posed in the analysis of entrepreneurship. Concurrently, the article examines whether a set of fundamental concepts of human existence appears across the theories.

The conclusion of the analysis is that the classic theories cannot solve the problems arising from the relation between the singular and the super singular, although to some extent these theories have produced the means to do so.

It is shown that the analytic and the dialectic logic that are the paradigms of the analyzed theories are able to explain the forms of existence that are under control, but it is also revealed that the fundamental, uncontrolled and uncontrollable social processes are not conceived as anything but prerequisites of the control processes.

Consequently, it is suggested that it is necessary to disengage the fundamental forms of existence found in the classic theories from their present paradigmatic restrictions. If the problem of the relation between the singular and the super singular is to be solved, the dialectic as well as the analytic logic has to be neutralized. It is thus suggested that the modern complexity theories could be the path to obtaining a more profound understanding of the uncontrolled human existence.

Further, it is shown that the analyzed theories have a number of fundamental concepts of human existence in common: *canalization* which encompasses transference of something from one to another, *correlation* which encompasses reciprocity, which in turn is the basis of generalization, and *combination* , which encompasses the production of the new. These theories also point to self-reference, although this concept does not have a completely transparent status in all the theories. And finally, the theories bring to attention the fact that it is necessary to determine whether human existence is to be viewed in a local or global perspective.

This article encompasses a short note on the problem of self-reference, and descriptions of the general and the specific theories of discontinuity.

The aim of the introductory note on self-reference is to outline the preconditions of the general theory of discontinuity. Consequently, the first section ends with a set of propositions determining the frame of reference within which the general theory of discontinuity is described. The frame of reference is qualified as four degrees of freedom, *difference*, *space-time*, *development* and *self-reference*.

The general theory of discontinuity modelled, among other things, by means of catastrophe theory [Thom 1975], is described in section two. The general discontinuity theory models the implicate order of human existence determined by the degrees of freedom mentioned. The theory also suggests a solution to the problem of the relation between the singular and the super singular, claiming that the singular and the super singular

are but different expressions of the same fundamental structures and processes of human existence

The specific theory of discontinuity offers a model of human existence which builds on the heritage of the classic theories. The model encompasses three fundamental developmental processes: *canalization*, which includes the process of *perspectivizing* the context of the person, *correlation*, which includes the process of *systematizing* the context of the person, and *combination*, which encompasses the process of *organizing* the context of the person. Because of the three developmental processes, the person obtains the qualifications to put his existence in *order* and acquires the competence to make *sense* of his existence in a *perspective* manner.

A theory, however, is no better than the methods it is able to carry into effect. As I have not personally developed a method for the production of data within the discontinuity theory, it is imperative that I incorporate that of others.

Part three includes a description of *perspective text analysis*, developed by scientists at the University of Lund. The objective of this part is to evaluate whether the method can be embedded in the discontinuity theory. It demonstrates precisely the way in which this method is capable of uncovering the manner in which a person, by organizing his existence in a certain perspective in an ordered manner, is able to make sense of his personal existence.

The goal of this paper is therefore to develop a basic theory of human existence that makes it possible by way of perspective text analysis to produce valid assertions about how the competent person makes sense of his existence.

A note on self-reference

If the object of the cognizing subject is the cognizing subject itself, it is as difficult to reach a *finite* cognition of the object as it is to play leapfrog with oneself. The following section highlights but a few simple examples of the difficulties associated with managing self-reference in a finite cognition of human existence. The intention of the description is to suggest that the difficulties cannot be overcome, for which reason self-reference has to be posited as a prerequisite of human existence instead of being a problem to solve.

Self-reference posited as structure

A classic answer to the problem of self-reference in the cognition of human existence is to dismiss or at least hide its existence. By describing the problem of cognition as a subject-object relation, without including the subject that describes the problem of cognition in the form of a subject-object relation, the structural philosophies try to allow the problem of self-reference to sink into oblivion.

The structural position is founded on René Descarte's dichotomizing proposition which states that the cognizing subject exists in an *independent* relation to the cognized object. If this is true, it is necessary to claim the existence of an independent subject which is able to cognize that the cognizing subject exists in an independent relation to the cognized object. As this proposition has to be true for any epistemological subject-object relation, evidently any subject-object relation itself has to be the object in another subject-object relation. This means that cognition appears as a progression of subject-object relations. The form of progression can be difficult to determine. It could, for example, appear as an infinite synchronous hierarchy, but it could also appear as an infinite diachronous progress depending on whether the prerequisite of the description is space or time. But irrespective of the form, human existence as self-referential cognition leaves behind a last subject which is the independent and uncognizable cognizing subject.

The work of Kant is naturally the classic example of the structural philosophy of cognition. When Kant, in his rebellion against Hume's scepticism, substantiated the highest level of human cognition, that is, pure reason, he claimed that it is a necessary subject structure [1975]. Kant did not deny that the subject is able to experience what

takes place in the world, but these experiences, that is, *differences*, are concrete and singular. A subject can, for example, measure the sum of the angles of a triangle as 180°. The subject can also repeat the measurement, although, on the basis of the measurements, the subject is unable to state the general proposition that the sum of the angles is 180°. It is impossible to generalize by association. To determine whether the proposition is true, it has to be proven mathematically, and this can be proven, because it is the nature of the subjective structure to be capable to proving. The subjective structure encompasses forms of cognition, the fundamental *time-space schema*, for instance. These schemata can produce the categories that systematize the immediate experiences of the subject. The rules of pure reason are the rules of the world, and as these rules of pure reason have to systematize the experiences, the rules of pure reason are valid for any experience. The rules are general and objective, even if they are structures of the subject.

As causality, according to Kant, is one of the forms which exist as a subject structure, the rule of causality is valid for the nature, although it is not valid in the nature. Differences exist in the world in time and space, and these can be experienced. Cognition, however, is the unfolding of objective subject abilities in the form of categories of reason, that is, rules.

It was Kant's conception of causality that gave Laplace the opportunity to formulate the principle of determinism.This principle states that, for a superior being of reason, that is, a demon who knows all the forces that move the objects of the world at a given moment and the corresponding locations of all the objects in the world, nothing will be uncertain. The present state of the whole universe is the effect of its previous state and the cause of its future state. For the all-knowing reason, the past as well as the future is present. The infinity of the self-reference stops in and is stopped by the uncognizable cognizing subject, the demon.

If the all-knowing reason is lifted out of Laplace's infinite subject and converted into an all-encompassing object, the classic conception of objectivity appears. By moving reason from the subjective to the objective world, Laplace's infinite being of reason loses the rule-generating ability and becomes Maxwell's calculating demon who, given time and energy, is able to calculate the past, the present and the future of the objective world. But even if it is assumed that the demon, that is, the calculator, can calculate all possible states of the world, the calculator is still unable to calculate the state of the calculator itself and because of that, the calculator cannot calculate all states.

One of the ways in which this problem can be solved is to render global self-reference impossible. If this solution is chosen, the philosophic price the cognizing subject has to pay is that complete or finite cognition becomes unthinkable. To reject the all-knowing, globally-cognizing subject even as a philosophical possibility means that the *world itself* becomes the great calculator that calculates the present only. Being the great calculator, the world cannot calculate the past or the future, it can only calculate, that is, develop itself at present. Within such a calculation or development, human cognition is a local calculation. In the local calculation, the *independent* cognizing subject cannot exist either, inasmuch as a local independence, in the last resort, will presuppose that a demon is thinkable, which is not the case in this solution.

Bohr [1964], for example, by way of his complementarity principle, tries to solve the problem of self-reference. Bohr's point of departure is the cognition of the electron. If a cognizing subject wishes to predict what is going to happen to an electron at the next instant, the subject has to know the present position as well as the impulse of the electron locally. As the cognizing subject is not a demon, the subject can only detect the position of the electron if light is thrown upon it.

Light is energy that propagates at a certain wavelength. Furthermore, it is impossible to indicate the position of the electron with greater accuracy than the length of a single wave. If light of a smaller wavelength is thrown upon the electron, the degree of accuracy increases, but a price has to be paid, as the impulse of the electron becomes greater by the admission of energy from the more energy-rich light of the shorter wavelength. The more precisely the position of the electron is located, the less precisely the

impulse of the electron is known and vice versa. This means that the object itself cannot be cognized, but it is possible to create a complemental insight.

It is the cost of local cognition that the cognizing subject can never dissolve itself from the conditions of cognition. Often, these conditions are ignored, but it has to be accepted - here, I am generalizing heavily on the basis of Bohr's proposition, as he did himself - that any cognition is a cognition only. 'The real reality' exists, of course, but cognition exists only because of the cognizing subject in the form of complementarity, that is, in the form of *structure* and *process* cognition.

The cognizing subject is part of the world itself, and the cognizing subject knows that it knows, but, because the subject knows that it knows, the knowledge, that is, the cognition belongs to self-reference.

I do not believe that the philosophy which, at a high level of generalization could be called structural, can solve the self-reference problem. Nevertheless, these philosophers have drawn the boundaries of the problem, as they point out that *difference* is the foundation of cognition, that cognition can only be comprehended in *time-space*, and that a solution to the self-reference problem demands a divine observer or a rejection of the finite cognition in favour of a local and complemental one.

Self-reference posited as process

Instead of trying to dispose of the self-reference problem, Hegel made self-reference the core of his philosophy. For Hegel, knowledge is not to be found by an independent cognizing subject. Knowledge is a quality of existence that emerges through a self-referential process.

In formalizing the development of self-reference, Hegel [1972] stated that the world is a contradiction, that is, a *difference* that follows a certain logic. The point of departure is the logical concept of thesis. The thesis necessarily generates its own antithesis, because it is the nature of the thesis to do so. When the thesis subsequently re-claims its own antithesis, the thesis *and* the antithesis are transformed into the synthesis, which is the thesis at a higher logical level. In the self-referential system, the resulting thesis is the truth of the precursive thesis at any level between the starting point, that is, the universal difference, and the final stage, that is, the absolute idea.

In terms of subject and object it could be claimed that the cognizing subject is the thesis that generates its own antithesis, the cognized object as a reflection of itself, where the synthesis is the meta-subject or the momentary, uncognizable, cognizing subject, which is the truth of the cognizing subject. Contrary to the thinking of structural philosophy, the subject is *not independent* of the object, but constantly producing the object and by that producing itself in a self-referential manner.

For Hegel, the development of cognition is the development of reality towards the absolute truth, where the absolute truth is the idea, that is, difference, at the highest logical level. Hegel's system therefore builds on the inherent self-reference that appears as a construction in which truth constantly emerges. Hegel called the structural solution of the self-reference problem 'the poor infinity' and his own process solution 'the true infinity', but both solutions lead towards the absurdity of infinity.

With a certain audacity, Hegel's thinking might be called the first attempt to produce a cybernetic model of self-referential cognition. At the very least, I believe that a degree of similarity exists between objective idealism and, for example, Bateson's epistemological theory [1972].

Bateson's point of departure is difference. He then defines information as any difference that creates a difference in another and later event, and finally he claims that a difference which is transformed through a series of events is an elementary idea [Bateson, 1972]. Bateson thus agrees with Hegel that the developing idea is the essence of mankind. But there is a fundamental difference, as Hegel's system is *global* and Bateson's system is *local*.

In Bateson's theory, all events in which a difference makes a difference are local subject-object relations. This means that the global coherence preserved in Hegel's

system through the emerging truth value of higher logical forms, that is, the synthesis, has to be established in another form.

To establish the coherence, Bateson uses an *interpretation* of Russell's class logic. Russell [1919] claims that the class of all classes is of another logical type than the classes being terms in this class. Bateson forces this logical form upon reality, as he claims that existence is composed of ordered layers, where a layer of a higher logical order is the *context* of a layer of a lower logical order. In this way, Bateson construes an infinite series of interdependent levels of the world in which the level of higher logical order reflects and determines the level of lower logical order. What Hegel claims to be a synthesis, Bateson states to be specific interdependent layers of the world. The two philosophers may be able to claim that something is cognition, but they are unable to claim that anything is virtually cognized. Cognition is the development itself.

Hegel and Bateson differ, of course, in respect to developmental logic, but the main difference is found in their global and local viewpoints, respectively. The problem of Bateson's local epistemology is that self-reference, in the last resort, disappears in the infinite hierarchy of contextual layers. Bateson thus encounters the same problem as the structural philosophies did. The problem of Hegel's global epistemology is that self-reference, which is the driving logical principle, has to be initialized by the greatest cognizer, the all-knowing principle, that is, God, and not a demon. Hegel also presupposes the uncognizable cognizer in his system.

The structure-oriented philosophers try to solve the self-reference problem in the dimension, time-space, while the process-oriented philosophers try to solve the problem in the dimension, development. Both movements of thought claim that difference is the basis of existence, and by that cognition, and both trends find a global as well as a local solution.

Even though this note represents only philosophical shorthand, I think the conclusion can be drawn that *self-reference* cannot be conceived independently of the concepts of *difference*, *time-space* and *development*.

Some choices and assumptions

No matter how the self-reference problem is solved, it has to be decided whether the perspective is going to be global or local. This decision is an either/or choice, and, as Kierkegaard [1963] convincingly argues, the choice cannot be substantiated as anything but a choice. I choose the local perspective.

In connection with Bohr's conception of local cognition, I pointed out that, as long as the subject produces processual insight, it is difficult for the subject to gain structural knowledge and vice versa, but both forms of cognition exist. The assertion of the existence of structural knowledge as well as processual insight implies that the local perspective is limited by *time-space* as well as *development*, but it also implies that structure and process cognition are manifestations of human existence itself. They represent forms in which human existence subsists as cognition. However, when human existence cognizes itself locally, that is, describes itself, the describing cannot be inscribed in the description. If this is a consequence of the local perspective, human existence must, at any time, be limited by (at least) one more degree of freedom than the description of human existence itself. To cognize human existence in itself is like examining a three-dimensional object through a two-dimensional projection. It is possible to make qualified guesses that can unfold the two-dimensional conception in the third dimension. The truth-value of the conception, however, will be implicit, because the subject that measures is itself part of the measured. Demons are not allowed in the local perspective.

It is thus impossible to avoid the self-reference problem, because it is only possible to describe the describing if an extra degree of freedom is continuously included. However, the assertion that human existence must have (at least) one more degree of

freedom than the description of human existence, implies that self-reference itself might be the uncognizable prerequisite of human existence.

Instead of claiming the existence of a demon or a God or pushing self-reference into the absurdity of infinity, self-reference can be claimed to be the prerequisite of human existence, that is, the degree of freedom that bounds and, by that, determines human existence.

However, if it is asserted that the local perspective determines that structural and processual cognition represent manifestations of human existence itself, it is necessary to presuppose that self-reference encompasses some degrees of freedom that make this assertion possible. The degree of freedom that makes structural cognition possible is, I believe, what philosophy has designated *time-space*. If it is claimed that something is structured, it is simultaneously stated that this something exists in time and space, which presupposes time-space as a degree of freedom. And being a degree of freedom, time-space cannot be cognized in itself. Likewise, the processual cognition presupposes its degree of freedom, namely development.

But, even if I assume that human existence is a self-referential phenomenon bounded by development and time-space, I have not accepted that cognition, and other human phenomena for that matter, adopt the classic form of a subject-object relation. I have only accepted that the subject exists in the form of structure and process. I do not, for example, accept that the subject perceives a difference because a difference exists in the world, or that a difference exists because the subject perceives it. I presuppose that differences exist because local subject-object units exist in which differences subsist.

This tautology means that the point of departure in the description of human existence is neither a dialectic dependent nor an analytic independent subject, but something else that I call a subject-object unit. The tautology also implies that difference itself is a presupposed degree of freedom, which means that difference cannot be conceptualized, but subsists as a boundary of human existence.

Founding propositions

The prerequisites of the discontinuity theory, that is, the degrees of freedom that bound human existence, can be described using the following four propositions.

First proposition: human existence subsists as difference.

Second proposition: human existence subsists as time-space.

Third proposition: human existence subsists as development.

Fourth proposition: human existence subsists as self-reference.

By these propositions, it is presupposed that human existence has some boundaries which cannot be transgressed. The propositions do not prescribe the nature of human existence. The propositions are not definitions but assertions on the degrees of freedom that bound human existence. The asserted degrees of freedom themselves can only be described as ways in which human existence emerges. They cannot be conceptualized.

For example, these prerequisites do not imply that I claim that differences exist, but that it is possible to make such a claim, that this is done, and that it has to be done to make it possible to describe how human existence continuously develops. 'Difference' is neither a proposition of the thing in itself, nor a reflection of reality, nor a construction of the environment, but the point of departure of discourse, where the discourse itself is the manner in which human existence develops locally as self-referential in time and space.

By saying this, I have also assumed that the discourse might be different, which, in the last resort, means that the prerequisites could be others.

In the next section, I shall consider difference, time-space, development and self-reference as determining human existence. In the subsequent section, I shall discuss the way in which development itself can be described as a space, bounded by the development prerequisites: correlation, combination and canalization.

The general theory of discontinuity

A preamble

The point of departure of the discontinuity theory is the assertion that the difference prerequisite emerges as a subject-object unit. This assertion is noted by the expression:

(S/O)

The expression is read: the difference prerequisite emerges as subject and object in such a way that it can be stated that the subject is a difference, which is the object, and the object is a difference, which is the subject. Figuratively, the expression states that difference is contained in the (S/O) unit. It is thus neither claimed that the subject experiences an objective difference nor that the subject posits a difference in the objective world nor that the object impresses a difference on the subject, etc. Difference is nothing but *the implicate order* of the (S/O) unit.

However, as the subject-object unit is claimed to exist, there must be something that claims, in relation to which the subject-object unit itself must be the object. The subject-object unit implies a subject - called a *context-subject* - for which the subject-object unit is an object. This assertion is noted by the expression:

(S/(S/O))

The (S/(S/O)) unit itself is, of course, an (S/O) unit, that is, difference. That the context-subject can appear is grounded in the fourth proposition. Figuratively, the expression states that the self-reference prerequisite is contained in the (S/(S/O)) unit. Self-reference is the implicate order of the (S/(S/O)) unit. Any (S/(S/O)) unit can naturally be encompassed by a context-subject. A series of contextualized (S/O) units is noted by the expression:

.....(S/(S/(S/(S/O)))).....

The series of (S/O) units is *not* an expression of a hierarchy, like Russell's [1919], for example. The series of (S/O) units is an iteration, that is, a *string* which posits a text: (S/O) and the context of this text: (S/(...)), where the context itself is a text, that is, an (S/O) unit. Any subject is therefore a context-subject of a subject-object unit, and any context-subject is a subject of a subject-object unit.

The string .....(S/(S/(S/(S/O))))..... contains nothing more and nothing less than the (S/(S/O)) unit, but fills up the space of self-reference without being, at any moment, this self-reference. The string is an iterative unfolding of the implicate order of self-reference.

Within the (S/(S/O)) unit it has to be the context-subject that singles out one part of the subject-object unit to be the subject, and the other part to be the object. This means that the (S/O) unit, that is, the difference as such, can exist in itself without a context-subject, but the (S/O) unit cannot. There has to be something - a context-subject - to single out the poles of the unit: the subject and the object, respectively.

If the context-subject, however, can single out the unit as an (S/O) unit, then the context-subject can *posit* the unit as *a specific* difference. And, as any context-subject is

a subject, any subject can posit the object as a specific difference, that is, as a subject-object unit.

To *posit* means to *discover* as well as to *produce* a specific difference.

By stating that something, that is, the subject, can posit something else, that is, the object, the time-space prerequisite is activated, inasmuch as it is unthinkable that something can posit something else outside space and time. To posit is a relation, and relations demand time and space.

If the subject can posit the object, the (S/O) unit has to appear as a relation in which the subject becomes an *agent*, and consequently the object becomes an objective. This relation, that is, time-space as the implicate order of the (S/O) unit, is noted by the expression:

(AaO)

In the expression (AaO), A designates the agent, O the objective and a the activity named to posit. This relation itself, however, implies that the context-subject posits that the subject posits the object because of which the (S/(S/O)) unit appears as an activity relation, noted by the expression:

(Aa(AaO))

The (Aa(AaO)) unit is the form in which self-reference emerges, given time-space and difference.

Because of the assertion that self-reference emerges as an (Aa(AaO)) unit, it is given that human existence has a direction, that is, it develops within the boundaries of self-reference, time-space and difference. The development prerequisite as the implicate order of the (Aa(AaO)) unit is an activity string which is noted by the expression:

.....(Aa(Aa(AaO))).....

The discontinuity theory therefore claims that human existence unfolds the implicate order of difference, time-space, development and self-reference, in the form of activity strings, that is, as a discourse.

In the succeeding section, I will describe the fundamental (Aa(AaO)) unit of human existence more closely, in order to be able to model the implicate order of the .....(Aa(Aa(AaO)))..... expression, that is, the discourse.

The degree of freedom: difference

Emerging as a local phenomenon, human existence subsisting as the difference prerequisite can be described in a structural as well as a processual manner, because time-space, development and self-reference are presupposed to be degrees of freedom. Figuratively, I can as a context-agent standing on the ground, defined by time-space and development, describe difference as it subsists as an (AaO) unit. Therefore when in the form of context-agent I describe difference in structural and processual terms, it means that the prerequisites, time-space and development, determine the description.

The point of departure of the *structural* description of the (AaO) unit is based on the above mentioned assertion that the agent can posit a difference, where the expression 'to posit a difference' means to discover as well as to produce a difference. Concurrently, it is asserted that the agent can designate the one side of the difference as 'a', for example, which implies that the other side is designated non-a (â). The difference of objective thus encompasses the *designated difference* a, called the a-designation and, by that, the designated difference non-a (â), called the â-designation, that is, a/â, where / means the limit between the a-designation and the â-designation.

From a processual point of view, the a-designation reflects everything else in the world by way of negation, which means that the a-designation becomes the ã-designation, the negative of which is the non-â-designation, that is, the a-designation. The negative of the negative or the double negation is the process that posits the limit of the a-designation.

The a/â-difference is produced because of the negative of the negative which encompasses opposing negations that appear as the limit between the a-designation and anything which is not the a-designation. The a-designation is nothing in itself, but something which is posited in a structural and a processual manner. The a-designation exists in the local (AaO) unit as an objective because of the difference prerequisite qualified by time-space as well as development.

It is therefore the point of departure that the agent in the (AaO) unit is able to posit the objective as something, the a-designation, and the negation of this something, the â-designation. The positing agent form is called the *designating attention*.

It is important to note that the concept 'the a-designation' does not refer to a thing. It is *not* possible to state, for example, that an orange is an a-designation which is different from another designated difference, an apple for instance, because of which the negation of the orange must be the apple. 'Difference' is of a much more fundamental nature. 'Difference' only subsists as the positing relation between the designating attention of the agent and the designated difference of the objective, that is, as the implicate order of the (AaO) unit.

The objective of the following is to show that difference which is the implicate order of the (AaO) unit can be modelled by the graphic expression of a formalism. The graphic expression which is a first order catastrophe as described by Thom [1975] constitutes the first in a series of models. The series of models which encompasses four catastrophes of ascending order unfolds the implicate order of the space bounded by the degrees of freedom difference, time-space, development and self-reference.

Human existence subsisting as difference modelled by a first order catastrophe

René Thom's theory encompasses seven elementary catastrophes [Woodcock & Davis, 1979]. It is Thom's stroke of genius that he proves mathematically that seven, and only seven, elementary catastrophes exist.

For the sake of dedramatizing the catastrophe theory, it must be said that a catastrophe is nothing but a discontinuity. Perhaps some forms of discontinuity, shipwreck, for instance, as analyzed by Zeeman [1977], are experienced as catastrophes, but they are nevertheless nothing but discontinuities.

The catastrophe models are topological and not metrical. It is thus impossible to measure within these models. This quality of the catastrophe models implies that it is possible to claim that a catastrophe can occur, but it is impossible to foresee whether a catastrophe will occur and even more impossible to predict when it might occur. A catastrophe model is in many respects comparable to a map which shows that a wood, for example, exists, without saying where. The map user knows that if he follows the map, he might find a wood, but as he does not know the exact position of the wood, he could miss it. But if he sees the wood, he can be sure that it is the very wood that is on the map.

Thom's seven elementary catastrophes are seven maps which, at a high level of generalization are claimed to be capable of modelling a variety of events. As stated above, it is impossible to foresee anything by means of catastrophe theory, but it is possible to claim that, if an event takes place 'catastrophically', it can be described by means of one of the catastrophe models. And, even more essential, the user of the catastrophe models does not need to create an isomorphism between what is to be modelled and the mathematical functions of the models, as it is the graphic expressions of the functions and not the functions themselves that constitute the descriptive potential of catastrophe theory [Woodcock & Davis, 1979]. The user of the formalisms of catastrophe theory does not encounter the same rigouristic requirements in modelling as the user of the formalisms of

analytical theory does. When modelling by means of a calculus, the user has to make sure that reality conveys meaning to the axioms and rules of the calculus. Contrary to this, the user of catastrophe theory can ignore the mathematical proofs and the founding functions of the catastrophes. The only requirement for utilizing the models is that the described phenomena are in fact catastrophes.

As a tool of explanation, a catastrophe model is not as powerful as a calculus, but, as mentioned earlier, it is impossible to use a calculus as a paradigm of explanation within self-reference in any case. The power of the catastrophe models lies in their ability to describe rather complex phenomena at a high level of generalization and in a graphic language without the user having to concern himself with the mathematical mechanics that lie behind. Catastrophe theory can model phenomena that otherwise could only be described in a phenomenological manner.

To provide an impression of how the graphic expressions emerge, I shall briefly outline a few conditions of the catastrophe models.

The point of departure of catastrophe theory is Laplace's concept of potential. Laplace claims that objects are always moved by the resulting force of all the forces that act on the object towards the state in which the potential is minimal, that is, the point of equilibrium.

Within psychology, Laplace's theory has been picked up, for example, by Lewin's topological model of personality [1969]. Lewin believes that the position of the person in his own life space can be determined by the set of forces, described as vectors, acting on him or within himself at any time. The person moves to the position in his life space in which the resulting potential is minimal. The entire historic life space of the person can then be described by a trajectory through the set of minimal states in which the person has been positioned. Lewin's life space can be imagined as a dented surface, where the person is like a ball constantly on the move and perpetually trying to settle in an indentation.

The possible forms of minimal potentials that are called *singularities* in the corresponding mathematical language are described as three states of *equilibrium* that vary in degree of *stability* [Woodcock & Davis 1978]. The *unstable state* is like a ball which is situated on top of a hill. The smallest push sends the ball downhill. However, if the ball lies on a narrow shelf, its state of equilibrium is *semi-stable*, because a push in the one direction leaves the ball where it is, while a push in the other direction will send it downhill. If the ball lies at the bottom of an indentation, it will resist a push in either direction. The state of equilibrium of the last ball is said to be stable [Woodcock & Davis 1978].

A number of curve forms express the different types of singularities. The type of curve or the curve family that concerns catastrophe theory is shown in Figure 1.

Figure 1 encompasses three graphical expressions: p, q and r of the equation $f(x) = x^3 - cx$. The r-curve has no singularity, which means that it does not describe a stable state. The q-curve describes at the point of inflection a semi-stable state, and the p-curve describes by the two singularities a local maximum and a local minimum, which in turn describe an unstable and a stable state, respectively. If a curve is moved from p through q to r, which means that the c-constant is changed in the equation $f(x) = x^3 - cx$, the movement corresponds to the destruction of a stable state. Therefore, if a ball is placed at the lowest point of the p-curve, and the curve is stretched until it passes into q, the ball will stay in its indentation until the very moment that the curve moves beyond q, then it will go downhill. Moving in the opposite direction, a singularity will be constructed and by that a local minimum.

This model describes quite precisely the relation between the designating attention, represented by the c-constant, and the a-designation, represented by the local minimum and the â-designation represented by the local maximum. When the local attention exists in a positive form, the curve has a stable a-minimum and an unstable ã-maximum. If the attention is diminished, which means that the c-constant moves towards 0, the dif-

ference disappears because of the disappearing maximum and minimum, which correspond to the disappearance of the agent and the objective.

However, if self-reference exists, the agent cannot disappear. The designating attention therefore continuously posits a designated difference, that is, a local minimum. If a local minimum disappears, another will appear.

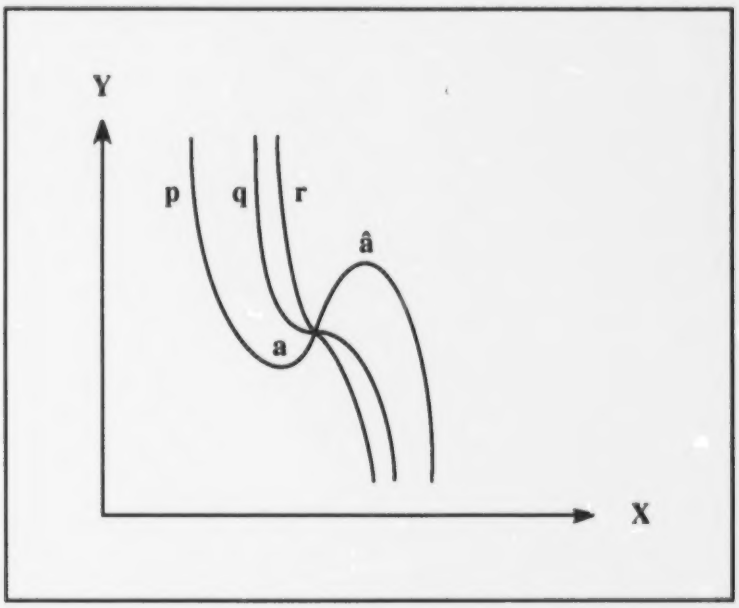

Figure 1. A curve family showing destruction, p → q → r and construction, r → q → p of a local minimum.

But even if the designating attention can only posit one designated difference at a time, the context-agent can posit all the possible designated differences corresponding to all the possible designating attentions. The description of all the possible states of the (AaO) unit can be modelled as a first order catastrophe, as illustrated in Figure 2.

Figure 2 sets out that the set of agent attentions which is described by the control dimension, attention, appears as a set of stable states, called a-stability, that mirrors the corresponding set of unstable states called ã-instability. This means that the objective in relation to attention appears as two sets of mirroring values, that is, all the stable states and all the unstable states because of the difference prerequisite.

The unbroken line represents all the possible stable states in which the objective can exist, that is, the set of minimum singularities corresponding to all possible a-designations. The broken line represents all the unstable states in which the objective can exist, that is, the set of maximum singularities corresponding to all the â-designations. The semi-stable singularity describes the very limit between the a-designations and the ã-designations, that is, difference.

The set of stable states, the unbroken line, is the attractor that describes the stable but discontinuous objective which is designated by the agent attention.

Difference can as the implicate order the (AaO) unit, be described from the position of the context-agent as a first order catastrophe that models the entire stable but discontinuous objective which is posited by agent attention. For any agent attention, it is possible to point to a designated difference, which at the slightest movement of attention discontinuously jumps to a new designated difference through instability.

It may be difficult to see the immediate benefits of the catastrophe theory in conceptualizing human existence, but, as the analysis continues, I will show that the foundation has been created for some models that will make sense in their interdependence.

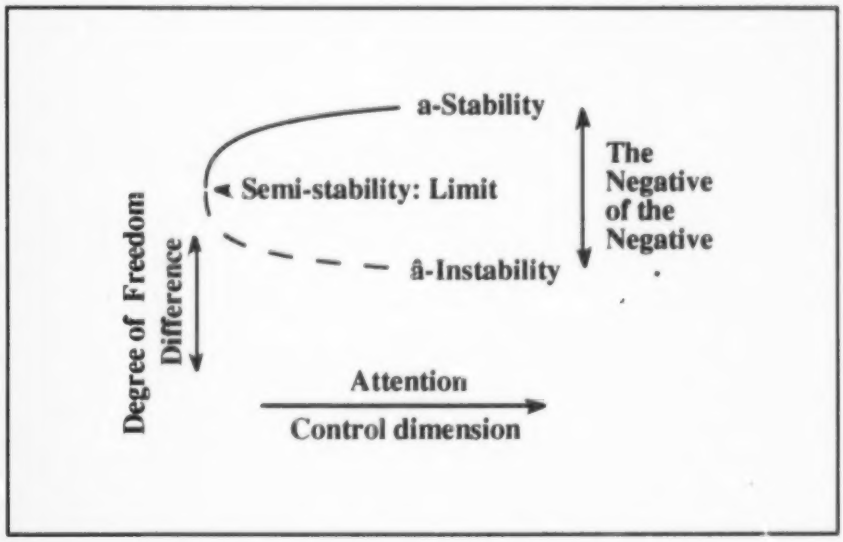

Figure 2. The (AaO) unit described as a first order catastrophe.

It should be borne in mind that the objective of the analysis is to model through the implicate order of the (Aa(AaO)) unit, which is defined by the degrees of freedom, difference, time-space, development and self-reference

The degree of freedom: time-space

The next step to be taken in conceptualizing the implicate order of the (Aa(AaO)) unit is to think of the agent as moving along the control dimension associated with attention. Each time the agent moves the slightest to the left or to the right on the control dimension, the corresponding objective changes discontinuously, which means that the a/ã-difference disappears, and a new one appears. A movement on the control dimension means that the agent erases the a-designation and posits another a-designation. Each time the designating attention is directed towards the objective, a new designated difference is discovered or created. A designated difference is a point on the attractor that describes the set of designated differences.

If, for instance, the new designated difference is named o, then the negation of the o-designation is the ô-designation, and, as the objective now is the o/ô-difference, the a/â-difference will no longer exist. Even if it is possible to describe the set of designated differences as a whole, it is only possible for the agent to be at a certain position on the control dimension at a certain time. The designating attention only designates one difference at a time.

If, however, the agent is able to claim, in spite of everything, that the a-designation as well as the o-designation exists, then the space in which the agent posits the objective must have an extra degree of freedom. If the a-designation exists as something in itself, and the o-designation exists as something in itself, and the a-designation is different from the o-designation, then the agent either has to be in two positions at once, which is impossible, or must to be embedded in a space that allows designated differences to exist as *separate* categories.

The required degree of freedom is, of course, already at hand, as the (Aa(AaO)) unit presupposes that the context-agent is able to posit the objective as agent and objective, that is, as an (AaO) unit. Because of the time-space prerequisite, it has already been stated that something can exist simultaneously as separate but related categories. Thus the required degree of freedom is not added arbitrarily but brought to bear here, where the next step in the description of the (Aa(AaO)) unit is taken.

For reasons to which I shall return later, I call the a-designation that exists as something in itself separated from the o-designation, the a-category. In the same manner as the a-designation *exists* as something in itself, the a-category, the o-designation must exist as something in itself, which is *different from* the a-category, that is, the o-category.

Within the time-space prerequisite, the agent can, for instance, say: »Here is the a-category and there is the o-category.« Or: »Now the o-category is here, but just before the a-category was here.« Given the time-space prerequisite, the agent posits the a-designation and the o-designation as temporally or spatially existing categories between which a *time* or a *space distance* exists. If this were not so, it would be impossible to talk about before and after, and here and there. I call the form in which the agent posits categories in time and space, *positioning*.

Given, for example, that the a-category represents land masses, and the o-category represents oceans, it is tempting to believe that the proposition a=ô is valid, that is, oceans are the negation of land masses. It is a common belief that a necessary connection such as that of land masses and oceans is a negation. However, this is not the case. If land masses are negated, the result represents everything that is not a land mass, and everything that is not a land mass is not an ocean.

Of course it is true that landmasses presuppose the existence of oceans, just as children presuppose the existence of parents. Child-&-parent and land masses-&-oceans constitute related positions that are based on difference, but they are not designated differences because *a time or a space distance* exists between the categories.

The implicate order of the (Aa(AaO)) unit, then, is described by the agent terms: *designating attention* and *category positioning*, corresponding to the terms of objective: *designated difference* and *time and space distance*.

Human existence subsisting as time-space modelled by a second order catastrophe

Given the self-reference prerequisite, the implicate order of the (AaO) unit determined by the time-space and difference prequisites can be modelled by a second order catastrophe. Expressed simplistically, the second order catastrophe is a folding of the two-dimensional, first order catastrophe in a third dimension.

As noted above, the first order catastrophe is controlled by the attention dimension. The second order catastrophe is controlled by the attention dimension as well as the positioning dimension.

It is not necessary to explain the mathematics behind the catastrophe models, as it is the graphical expressions that model the (AaO) unit. And furthermore, the catastrophe models are not intended to predict anything. The models express the implicate order of the (AaO) unit only. The second order catastrophe model is illustrated in Figure 3.

In Figure 3, the three-dimensional shape represents the objective, while the agent is represented by the control dimensions: attention and positioning.

The double folding of the second order catastrophe can describe how positioning splits the objective in such a manner that an upper and lower and middle layer emerge on the surface of objective. As the middle layer looks like a cusp (the hatched area between attention and positioning) when it is projected on the control surface, that is, the agent surface, the second order catastrophe is called the cusp-catastrophe [Zeeman, 1976].

In the model, the upper layer of the objective represents the o-category, the lower layer represents the a-category, and the middle layer represents the time and space distance between the categories, that is, the area which is neither the a-category nor the o-category.

If the attention moves within the area which is controlled by positioning, illustrated by the curve parallel to the attention dimension, the objective jumps to and fro between the upper and the lower layer. The objective jumps between the a-category and the o-category, because the middle layer is inaccessible. It is only on the upper and the lower category layers that the agent can posit the objective in a stable form, that is, as a category.

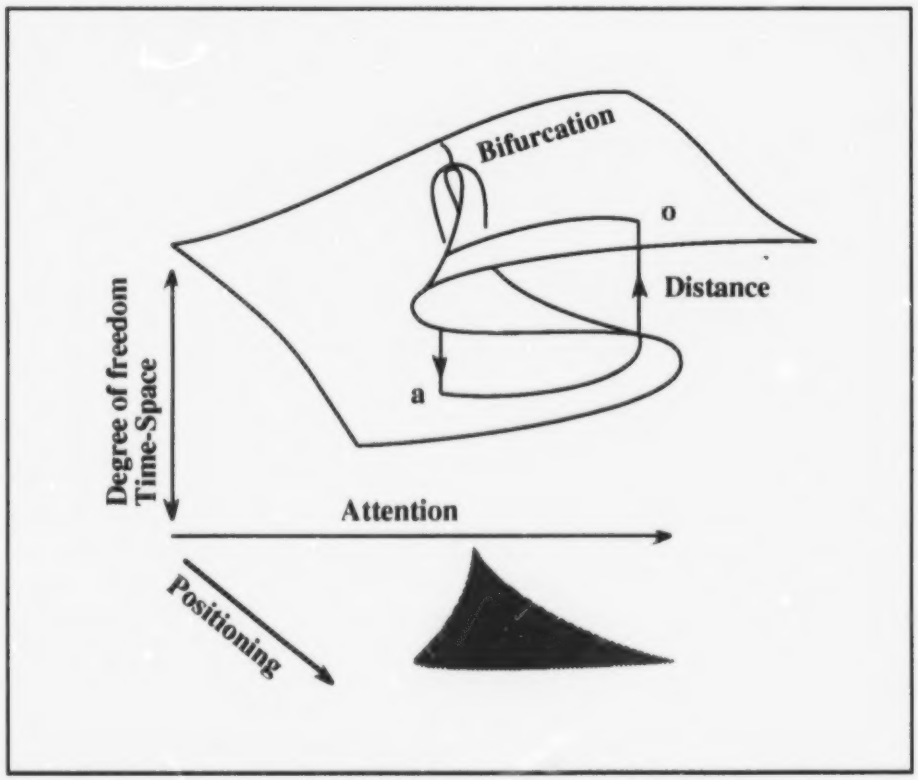

Figure 3. The (AaO) unit described as a second order catastrophe.

If the agent positioning moves towards zero, the corresponding point on the surface of objective will reach the topological singularity where the three layers join. At the bifurcation point, the categories cease to exist as they merge into a designated difference, because the distance, and by that, the borders of the categories break down. If the agent positioning moves in the opposite direction, that is, from back to front, the surface bifurcates in the topological singularity. At that point, the categories dissociate, which means that a category discontinuity emerges.

The cusp-catastrophe does not explain why the distance between the designated differences emerges. The catastrophe model only illustrates that a bifurcation can occur. If, however, a bifurcation occurs, the model describes how the separated categories are related because of the agent, that is, as discontinuity which is determined by positioning.

The second order catastrophe models the implicate order of the (AaO) unit, which is determined by difference and time-space as it is posited by the context-agent. Self-reference is therefore the degree of freedom without which it would be impossible to describe the (AaO) unit and, by that, the (Aa(AaO)) unit, as the context-agent is itself an agent in the .....(Aa(Aa(AaO)))..... string.

The degree of freedom: development

The next step in the description of the (Aa(AaO)) unit concerns development. By way of introduction, it is assumed that the agent positions the a-category, a line segment, for example, in a manner that permits the agent to state that at the moment t_1 the line segment is broken, while it is full-drawn at the moment t_2, no matter how short the time interval is between the moment t_1 and the moment t_2. By describing an event in this manner, I amapparently saying that the a-category remains the a-category, even if it looks different, that is, in terms of numerical identity, and that the a-category has changed spontaneously within its own borders. The first question to be answered is whether any of the prerequisites determine spontaneous change of the a-category. The answer is no. None of the prerequisites asserts that spontaneity is an acceptable concept. The degrees of freedom, however, allow the agent to enact the objective. To posit, for example, is an activity that relates an agent to an objective. Within the frame of reference it is therefore possible to talk in terms of occasion and consequence. The agent can be conceived of as the occasion of the objective, just as the objective can be conceived of as the occasion of the agent. By that, it is not claimed that a specific occasion has a specific consequence, but merely that spontaneity is out of the question, while occasion and consequence are acceptable concepts.

The next question to be asked is whether the a-category is still the a-category, even if, for one reason or the other, it has changed. In other words, is numerical identity a valid concept within the frame of reference? The answer again is no. The problem of numerical identity appears because the example deceives, as time distance and duration are mixed. In the above-mentioned example, the a-category is not the same at the moment t_1 as it is at the moment t_2. In the example, it is the time distance and not the duration that is at stake. This is, however, easily overlooked, because of the time it takes the agent to position the category. The time it takes to position the category, however, is not the same as the time difference which is related to positioning. The a-category at the moment t_1 is something else at the moment t_2, although the new category is situated at the same position as the a-category was.

Nevertheless, the development prerequisite is not unfolded merely by claiming that something for some reason does not stay the same. It is the fundamental problem of development that the occasion-consequence assertion cannot be maintained if it is claimed simultaneously that the categories that constitute the occasion are separated from each other in time and space. If anything is going to happen in the world of categories, the categories defined by distance somehow have to exist without distance. The border of the a-category, as well as that of the o-category has to be broken down if they are to enact each other. The break-down of borders, however, contradicts the precondition of these categories, as the categories only exist if a time or a space distance exists, no matter how small the metrical distance might be. The a-category can only enact the o-category if the distance is negated, and this means that the a-category as well as the o-category no longer exist as independent categories.

The (only) solution to the problem is that the a-category enacts the o-category, and the o-category enacts the a-category in a third dimension, that is, a dimension in which the a-category and o-category are not the a-category and the o-category but something that I call the *a>-<o-instant*, that is, the a-category and the o-category without a distance.

The a>-<o-instant is the form in which the a-category and the o-category exist when their mutual borders are negated.

The point at which the extra dimention emerges has to be the topological singularity of the second order catatstrophe, as it is at this point that the bifurcation of the categories takes place, that is, the point at which distance no longer exists (see Figure 3). The a-category and the o-category have to exist in such a way that neither the a-category nor the o-category exists as a separate category. But as the a-category and the o-category do not return to the state of non-bifurcation, that is, pure difference, the a>-<o-instant has to exist

as an extra dimension, which is added to the second order catastrophe. I shall return later to the development prerequisite described as a third order catastrophe.

If the a-category and the o-category are to enact each other, an extra degree of freedom, that is, the development prerequisite, is needed. The introduction of the development prerequisite naturally opens up the possibility of qualifying the agent as well as the objective.

The point of departure must be the time distance and the space distance, as it is distance that maintains the a-category and o-category as separate categories, but the appearence of the a>-<o-instant must also be described. This means that the a-category has to be *oriented* towards the o-category, as the o-category has to be oriented towards the a-category. This orientation is denoted a⇔o-orientation. The a⇔o-orientation is the *dynamic distance* between the a-category and the o-category. It must therefore be possible to describe the a-category and the o-category orienting themselves towards each other, which is denoted +a⇔o-orientation, joining in the a>-<o-instant, and orienting themselves away from each other, which is denoted -a⇔o-orientation in order to be independent categories that *differ from the way they were before the enactment.*

Until now, I have merely claimed that the *dynamic distance* between the a-category and the o-category is pulsating between a positive toward-form and a negative away-form. I have not specified what happens in the a>-<o-instant, that is, what the +a⇔o-orientation is in comparison to the -a⇔o-orientation.

To be the a⇔o-orientation that becomes the a>-<o-instant, the categories have to be something special. This special quality, I believe, is *absence*. Being the a⇔o-orientation, the o-category, for example, is not only determined as something in itself, but is also determined as the absence of the a-category.

In the a⇔o-orientation, the o-category is that which the a-category reaches out for, as the a-category is that which the o-category reaches out for. In the a⇔o-orientation, the o-category is something present, which in turn represents the future of the a-category. Likewise, the a-category is something present, which in turn represents the future of the o-category. The assertion implies that the development prerequisite emerges as a demand, which means that the a-category demands something else, the o-category, for example, to be developed. The demand, however, neither exists in the a-category nor in the o-category, but in the a⇔o-orientation. The development prerequisite forces a new order onto the implicate order of the (AaO) unit, as it is determined by the difference and the time-space prerequisites.

The point of departure for qualifying the a-absence category is an intellectual experiment in which it is claimed that only one category exists in time and space. At first it seems impossible to imagine a sole category, as the categories are determined by distance. If the a-category is alone in the world, no distances exist, because of which the a-category can be nothing but a designated difference, and therefore cannot be a category. However, if, in defiance of everything, the category has to exist, then the designating agent must be able to posit the other side of the designated difference, that is, non-a, as something in itself. If the distance that makes the sole category possible is to emerge, given the a-designation and the a-designation only, then the a-designation, as well as the negation of the a-designation, that is, the â-designation, has to be something in itself. This means that the unstable state the â-designation is posited as something stable, and it is this stable state which is qualified as the designated difference, a-absence, which is noted ã-designation.

When the absence of a, that is, ã-designation is positioned as a category which is as real as the a-category, the a-category can exist as the 'sole' category because of its distance to the ã-category. The a-category and the ã-category reflect each other in time and space in their mutual distance.

It is necessary to understand that the â-designation, is different from the ã-designation. While the â-designation is the infinity of the objective, as it represents anything which is not the a-designation, the ã-designation is something finite. And it is the time-space prerequisite that makes the difference between the â-designation and the ã-designa-

tion. This whole analysis might appear to be a play on words, but this play expresses the virtual reality that if the existence of something can be claimed, then the absence of something can also be stated. If, for example, money exists, then absence of money also exists. I can state that I have no money, which is quite different from having non-money, as non-money is anything else but money.

If, however, the ã-designation is something in itself, it can be negated. Consequently, it might seem as if the negation of the ã-designation is identical with the a-designation. However, it is impossible to transform the stable state ã-designation into another stable state, that is, the a-designation by negation. The negation of the ã-designation must be the unstable state of the non-ã-designation, which is noted a'-designation. In Figure 4 the solution of the sole category problem is illustrated by a graphic expression.

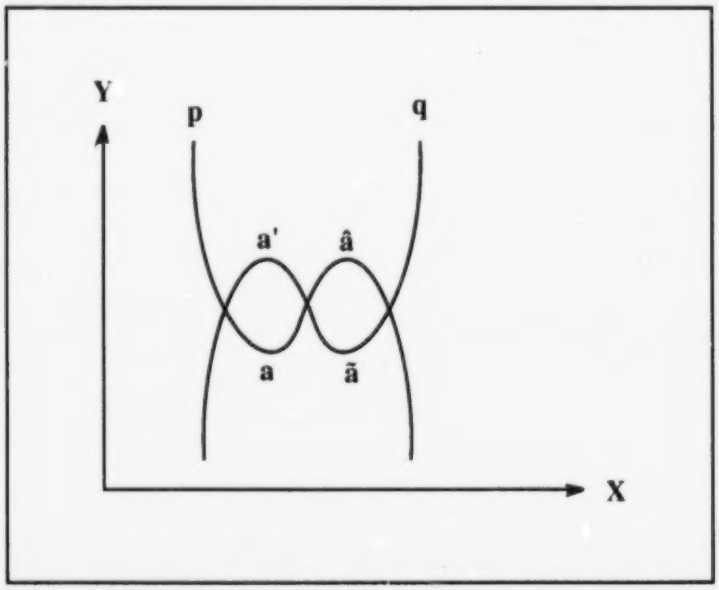

Figure 4. The set of designations that originate the sole category.

Figure 4 includes two mirroring curves, p and q. The p-curve that encompasses the stable minimum a and the unstable maximum â models the objective as the a-designation and the â-designation. The q-curve mirrors the p-curve inasmuch as the unstable state â is posited as the stable state ã, which by negation evokes the corresponding unstable state a'. Thus, the negation of the ã-designation, that is, the a'-designation, reflects the a-designation.

The corresponding a'-category is, of course, like the â-category an infinite category, but, contrary to the â-category which is anything but the a-category, the a'-category is exactly the a-category but in an infinite manner, because the a'-category is the presence of the absence of the a-category. The a'-category is as the infinite reflection of the a-category, the information of a. I shall return to information later: here it is only the absence of the a-category that is of interest.

The categories can therefore exist independently of each other in time and space. If, however, the development prerequisite *is* the implicate order of the (AaO) unit, which means that the a>-<o-instant exists and, by that, the a⇔o-orientation, then the a-category has to be qualified as the a-category which is the ô-category, and the o-category has to be determined as the o-category which is the â-category. The development prerequisite determines an implicate order which is the orientation of the a-category towards the o-category, *because* the a-category is the õ-category, and as the orientation of the o-category towards the a-category, *because* the o-category is the ã-category, that is, the a⇔o-ori-

entation which becoms the a≻≺o-instant. I call the form of the agent that posits the a⇐⇒o-orientation, that is, the dynamic distance between the a-category and the o-category, *intention.*

Exchange, for example, can illustrate the oriented relation between two categories. The first category could be 'potatoes and no shoes', and the second could be 'shoes and no potatoes'. In this example the a-merchant is defined as potatoes and absence of shoes, while the o-merchant is defined as shoes and absence of potatoes. The first merchant is not the negation of the second merchant, even if the one cannot be conceptualized without the other. Likewise, the oceans represent absence of land-masses as landmasses represent absence of oceans, but they are, as oceans and land-masses, separate categories with no limit in common.

Orientation and instant are necessary but not sufficient qualifications of the implicate order of the (AaO) unit which is determined by the development prerequisite. If development takes place, it must be a pulsation between the existence of the a⇐⇒o-orientation and the existence of the a≻≺o-instant. This means that the dynamic distance is negated, but also that the negation of the dynamic distance, that is, the instant, is itself negated. The process is a *negation of the negation* in which the a≻≺o-instant continuously becomes the a⇐⇒o-orientation that becomes the a≻≺o-instant. In the process, the time-space distance is negated to re-appear by negation. The expression: the negation of the negation, however, does not reveal the form in which time-space is re-created.

An example might illuminate the relation between development and time-space. When a football player kicks a ball, we would all claim that the kicking foot causes the flying ball. The problem is, however, that as long as the foot is something in itself and likewise the ball, a distance exists between the ball and the foot, because of which the foodball player cannot kick the ball. The example corresponds to Zenon's Achilles paradox. In a race between Achilles and a tortoise, Achilles cannot catch up with the tortoise if the tortoise is the first to start. Expressed simplistically, the reason for Achilles losing the game is that, at any point in the race, he has to halve the distance between himself and the tortoise, but, as the distance still to go also has to be halved, Achilles never reaches the tortoise. A similar relation exists between the foot and the ball. But luckily, the football player does not know this, so he kicks indefatigably, and, because the ball flies in spite of Zenon, it is necessary to realize that even if a distance exists between the foot and the ball before as well as after the kick, the distance disappears in the kick itself. In the kick, the ball and foot are one and the same. It is the 'kick' which represents development in the form of the negation of negation, that is, destruction and re-creation of distance.

Human existence subsisting as development modelled by a third order catastrophe

The third order catastrophe is called a swallowtail catastrophe, because the bifurcation points of the surface of objective projected on the agent surface, given certain conditions resemble this shape (See Figure 5). The third order catastrophe consists of a three-dimensional agent surface that determines a four-dimensional surface of objective. The control dimensions which constitute the agent surface of the model are attention, positioning and intention.

Unfortunately, it is impossible to draw a four-dimensional surface of objective. To gain an impression of the third order catastrophe, it is necessary to keep constant one of the agent dimensions. The dimension kept constant is attention, which is presupposed to exist in such a manner that the a-, o-, ã- and õ-designations can be claimed to exist. The attention is therefore continuously divided, which makes it possible to pay exclusive attention to the manner in which the agent dimensions, that is, intention and positioning, determine the surface of objective.

Figure 5 shows the way in which the surface of objective encompasses three sets of stable states, that is, the a-category, the o-category and the a⇐⇒o-orientation. The a⇐⇒o-orientation constitutes a state between the a-category and the o-category. When the a-category and the o-category move along the intention dimension, the a-category and o-category fall off the edge into the state of a⇐⇒o-orientation, so to speak.

The a⇔o-orientation is, however, not the a>-<o-instant. If the a>-<o-instant is to exist, the a⇔o-orientation has to move along the attention dimension towards the disappearance of the a-category and the o-category and, by so doing, towards the disappearance of the a⇔o-orientation as well. This means that the a⇔o-orientation moves along the attention dimension towards the point at which the a-category and the o-category bifurcated. Figure 5, however, cannot illustrate this movement.

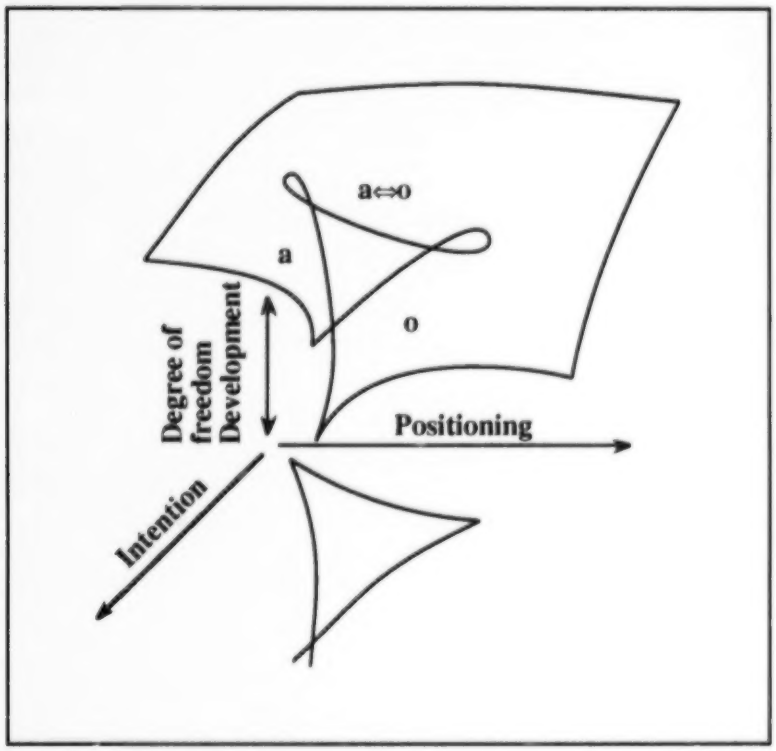

Figure 5. The (AaO) unit described as a third order catastrophe.

To gain an impression of the movements in the swallowtail catastrophe, it is necessary to consider the set of bifurcation points shown in Figure 6. The set of bifurcation points emerges when the four-dimensional surface of objective is projected onto the three-dimensional agent surface. The swallowtail is therefore a single cross-section of the spherical figure shown in Figure 6. If all possible plan projections, that is, all the swallowtails, are added along the attention dimension, Figure 6 will appear.

Figure 6 models *negation*. The a-category and o-category that form the a⇔o-orientation move along the attention dimension towards the topological singularity, the a>-<o-instant, which is the point at which the a⇔o-orientation exists as disappearing. In the a>-<o-instant, the uttermost limit is reached, a limit that has to be negated if the a⇔o-orientation and by that the a-category and the o-category, are to be recreated as something different.

The model represents the negation as such, but not the *particular* development. The model only shows that something is negated to a point at which the negation of the negation takes place.

In the a>-<o-instant everything is uncertain. The a⇔o-orientation does not vanish into thin air, but it is impossible to predict the exact outcome of the discontinuity.

As noted above, the model only describes the implicate order of the (AaO) unit which is determined by the development prerequisite. It neither describes the content nor

the form of its development. And it is still important to remember that it is the self-reference prerequisite that renders the context-agent that posits the (AaO) unit possible.

I believe that development itself constitutes a space which is determined by the degrees of freedom: canalization, correlation and combination. These prerequisites will be the subject matter of the third section.

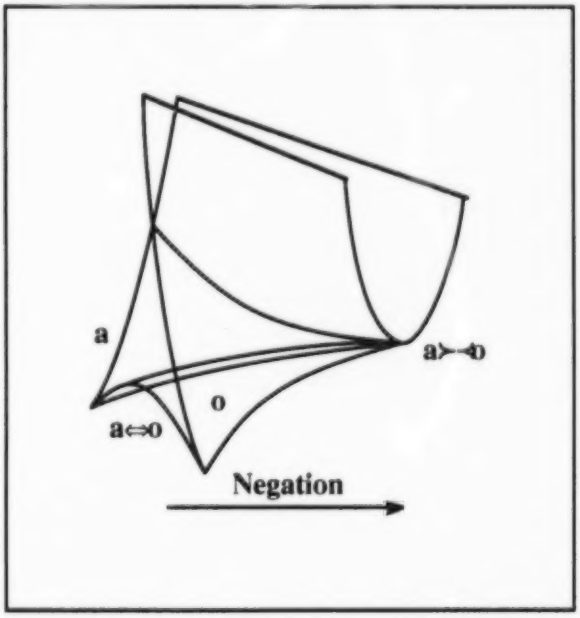

Figure 6. The bifurcation set of the third order catastrophe.

The degree of freedom: self-reference

The self-reference prerequisite is the most easy and yet the most difficult order to capture, because it encompasses the other degrees of freedom and, simultaneously, is inscribed in the unfolding order of these prerequisites.

If the agent in the (AaO) unit posits the objective which is the a⇔o-orientation as an (AaO) unit, which means that the a-category, for example, is posited as the agent of the orientation, the primary agent becomes a context-agent.

When the agent posits the oriented relation between categories as agent and objective, the positing agent unfolds the (AaO) unit as an (Aa(AaO)) unit, that is produces the .....(Aa(AAaO))..... string. This means that the point of departure, that is, the context-agent as a prerequisite, is the point of termination. The implicate order of the (AaO) unit determined by self-reference is simultaneously the way in which self-reference unfolds as development, time-space and difference.

Self-reference itself is uncognizable, as are difference, time-space and development. The four degrees of freedom that determine the space of human existence remain fundamental propositions that cannot be conceptualized as such on the basis of these propositions.

Final remarks on the general theory of discontinuity

Imaging self-reference as a process in which the context-agent posits the (AaO) unit and by that is posited by the (AaO) unit as a context-agent, that is, as a .....(Aa(AaO)).....

string, the space of human existence, in general, can be described in terms which state that human existence develops and is developed discursively.

I think that the terms: intentionality, stability and discontinuity, capture the image I which to draw. The term 'intentionality' has been chosen because I want to emphasize that human existence encompasses a kind of intention: not because human existence is directed towards some final goal, but because human existence expresses a directed process, which is continuously created because of itself. 'Stability' has been chosen to emphasize that human existence remains human existence, even if it develops discontinuously. 'Discontinuity' has been chosen to maintain the conception that human existence is fundamentally unpredictable, which means that theories of human existence have to be based on the modern logic of complexity. The logic utilized is thus neither analytic nor dialectic, although this does not imply that parts of human existence are uncontrolled[1]. However, control processes are not the subject matter of this paper.

In the next section, the analysis concerns the three degrees of freedom, canalization, correlation and combination, that constitute the space of development. After describing these prerequisites, I shall return to the unfolding of self-reference, that is, the discourse.

The specific theory of discontinuity

I think that the three fundamental forms of development: canalization, correlation and combination that are derived from the classic theories [Elstrup Rasmussen 1994] generate complex human existence. The three forms of development are not prerequisites at the same level as difference, time-space, development and self-reference; they are forms of human existence within development. It is therefore the common feature of the developmental prerequisites that they are negations of the fundamental developmental negation, that is, they transform the a><o-instant but in different ways.

The degree of freedom: canalization

In Elstrup Rasmussen [1994] it was argued that the classic theories claimed that canalization is a form of social development. I shall continue this line of thought. However, it is not the aim of the present article to discuss the peculiar nature of canalization in a critical manner. I do not want to prove other theories right or wrong. I only aim to show that canalization, which at a phenomenological level is describable as transference and appropriation, can be conceptualized within the general discontinuity theory provided that canalization is assumed to be a form of development.

I do not question whether canalization, or combination or correlation for that matter exist as developmental forms. This question has already been settled, as I accept the inheritance from previous generations. I do, however, intend to manage assets and liabilities differently, because I believe that the idea of the uncontrolled processes of development have been neglected in favour of gaining knowledge of human control mechanisms. The process of control exists, of course, but this form of human existence, no matter how important it might be, does not develop the diversity of human existence. I also think that analytic as well as dialectic logic, contrary to the modern logic of complexity, are control logics, because of which they are unsuitable as tools for modelling the fundamental processes of human development.

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1 The problem of theories based on analytic and dialectic logic versus theories based on modern complex thinking is examined in Elstrup Rasmussen [1994].

Category movements

The first image of canalization I want to consider is that of a landscape of hills and valleys. Each valley contains some balls, that is, has a certain capacity. Now and again a ball moves from one valley to another. The most simple form of canalization can be described by the notation shown in Figure 7.

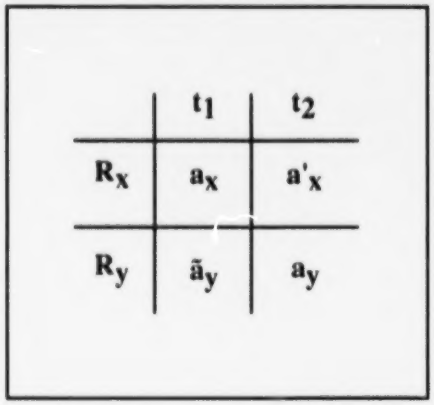

Figure 7. The movement of the a-category from the x-capacity to the y-capacity.

The notation designates that the landscape (R) has a number of valleys, that is, the x-capacity and the y-capacity. Each capacity contains many categories. One of the categories (a) moves from the x-capacity to the y-capacity. At the moment t_1, the a-category qualifies the x-capacity, while the y-capacity that does not contain the a-category at the moment t_1 is qualified by the ã-category, which means that the a-category is absent from the y-capacity. As stated above, the ã-category is as real as the a-category. In human existence, for example, it is just as real to have no money as it is to have money.

At the moment t_2, the x-capacity is qualified by the a'-category, that is, information, while the a-category qualifies the y-capacity. The movement of the a-category from the x-capacity to the y-capacity can be described from a phenomenological point of view as: x transfers the a-category to y, while y simultaneously appropriates the a-category from x.

If the objective of the (AaO) unit can be described by a matrix like the one above, it is called *thing movement*. The a-category is called a *thing*, and the a'-category is called *information*. What determines the *objective* as a thing movement, and, by that, the a-category as a thing, is that the category does not change qualitatively when processed, and that something, the a' category, exists in the transferring capacity after the appropriation has taken place. The thing movement is qualified by the a-category leaving a track, the a-information, in the process. 'Thing' and 'information' will be further qualified as the description unfolds.

Transformed into a person description, the matrix can be read as follows: Smith gives Jones, who has no money, his last cent. As Smith hands over his money, Jones becomes richer by a cent, while Smith only encompasses the information of the cent. Smith is able to remember that he once had a cent.

It is important to note that each category is embedded in time and space, that is, the category has a specific position in the network of categories. It is also significant that it makes no difference for canalization whether, for example, the *organization* called the Red Cross gives clothes to distressed refugees, or whether an old lady gives an ice-cream to a child. It is merely stated that the canalization prerequisite which is the implicate order of the (AaO) unit is realized when a thing moves from one singular position in time and space to another.

Even if the processing of information and things follows the same rules, information processing can be defined within a separate structural time and space matrix as noted in Figure 8.

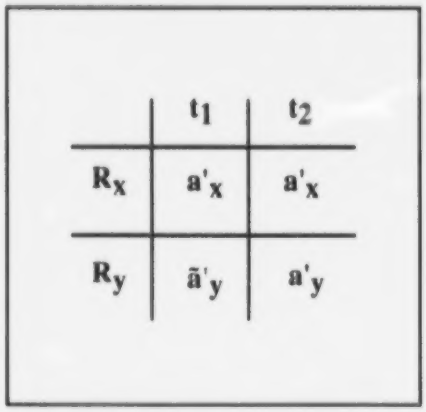

Figure 8. The movement of the a'-category from the x-capacity to the y-capacity.

This matrix shows that the x-capacity encompasses the a'-category, that is, information, at the moment t_1, while the y-capacity does not include the a'-category. At the moment t_2, the x-capacity, as well as the y-capacity, encompasses the a'-category. A category thus moves from the x-capacity to the y-capacity without the x-capacity losing its qualifying category. This matrix defines the a'-category, that is, information, as something that can be divided without becoming less or different. The a'-category does not diminish quantitatively or change qualitatively. The a'-category is, of course, bounded, as it is qualified as a-information but is unlimited.

This peculiarity of the a'-category has already been mentioned in the previous section, in which the a'-category, unlike the a-category, was qualified as having a stroke of infinity without being infinite. The a'-category is bounded but unlimited, that is, something 'internal infinite' that can be divided, without any portion of the a'-category being quantitatively less than the whole a'-category. By that, I have not claimed that the *process* of division is unlimited. The division of information can go on, but only within the untransgressable boundaries of human existence itself.

It is the concordance between the processing of thing-categories and information-categories that makes this conception different from other attempts to conceptualize the developmental forms of human existence. Differences between thing and information exist, of course, but basically the so-called material and ideal categories are processed in the same manner, that is, they follow the same logic of development. Perhaps the persons involved experience great differences between thing and information processing. However, this is of no interest at the present level of generalization, as the only concern of this description is to outline the process of moving something *human* from one position to another within human existence.

The reason why things and information can be treated in the same manner is, of course, that the movement is qualified within the degrees of freedom, difference, time-space, development and self-reference. Within this frame of reference, a thing is not more 'an sich' than information. Both are something human in the form of a category. It is thus not the canalization prerequisite as such that separates information processing from thing processing, but the qualitative peculiarities of the thing category and the information category respectively.

Dimensioning and proportionality

It does not matter whether it is things or information that move: nothing qualitatively new happens to the existing set of categories, but time and space changes. The canalization prerequisite determines time and space in such a way that it can be said that the quantitatively limited category, the thing, is *relocated,* while the quantitatively unlimited category, the information, is *doubled*, which means that the objective encompasses time and space *relativity*. If the objective did not encompass relativity, it would not be possible to talk about anything being relocated or doubled.

The (AaO) unit, however, presupposes an agent positing the objective, for which reason the relativity has to have a corresponding agent expression. The agent which is intention, because of the development prerequisite has to be something specific, because of the canalization prerequisite. I call the intentional relocation and doubling of categories in time and space *dimensioning*. The agent dimensions the objective, that is, posits the objective as relativity.

The canalization prerequisite introduces directions and steps, that is, the discrete movement in time and space. Canalization is, as the negation of the negation, an ongoing *repetition* of the third order catastrophe, which means that canalization figuratively divides the intention into discrete segments. Canalization is the *natural clock* of human existence that divides human existence itself into intentional discontinuities.

Perspective schematizing

The agent dimensioning and the relativity of objective describe the (AaO) unit but not the implicate order of the (Aa(AaO)) unit. In the (Aa(AaO)) unit, the context-agent figuratively grasps the process and the structure of the (AaO) unit. In accordance with Kant [1975], I call the manner in which the context-agent posits the (AaO) unit, *schematizing*. Schematizing is the *general* form of the context-agent, as it is determined by the self-reference prerequisite that determines the development prerequisite.

I call the *specific* form of schematizing determined by canalization, *perspective schematizing*. This form of schematizing is the manner in which the context-agent posits the agent as dimensioning the objective as relativity, that is, as relocated and doubled categories.

When, for instance, a football commentator enthusiastically cries: »The goal keeper kicks the ball to the back line.«, he expresses the perspective schematizing by help of the *preposition* 'to'. The commentator is the context-agent, the goalkeeper is the agent, the ball and the back line constitute the objective. The expression indicates that the context-agent puts the (AaO) unit into a certain perspective, that is, posits that the ball moves from one position to another looked at from the agent's point of view. In due course, I shall return to the fact that the goalkeeper also kicks the ball.

The many category movements

In principle, the entire population of the world, that is, human existence itself, can be imagined as a multidimensional web in which each person represents a node. In such a *network*, any node is in principle related to any other node, which means that information, for example, created in the network can reach all network nodes, directly as well as indirectly. The network exists in time and space in the form of *networking*.

Below, I shall outline two simple models to describe networking. Given a set of nodes, that is, capacities among which two opposite ideas move, it is possible to hypothesize that each time a capacity appropriates positive information, the capacity becomes positive, which means that it transfers positive information to other capacities. It could also be hypothesized that a node has to appropriate negative information n times before it becomes a negative capacity which transfers negative information. This means that a connection exists between the amount of positive and negative capacities in the network. This type of networking can be described by a logistic equation.

If, for instance, the number of carp in a lake is X, and the growth rate because of mating is c, and none of the multiplying carp die, then the number of carp will be cX the

following year [Worg, 1993; Gleick, 1990]. The carp population can therefore be expressed by a simple function, where the *history* of the function can be plotted as the set of values that emerges by inserting a starting value X_{old} in the equation $X_{new} = cX_{old}$, followed by the insertion of the result of the calculation, that is, X_{new}, in the same equation at the position of X_{old}. If the same calculation is repeated with values that are generated in this process itself, the process is called a function iteration.

Evidently the lake will be overpopulated very soon as the number of carp grows exponentially. The carp die, however, when food becomes scarce. If a pond can sustain X carp only, which is noted X_{max}, and if it can be stipulated that the growth is restrained by a factor $(X_{max} - X_{old})$, it is possible to express the development of the number of carp in the lake by the equation $X_{new} = cX_{old}(X_{max} - X_{old})$. This equation has been used by biologists, with great success, to calculate the size of next year's population on the basis of this year's population. For a constant c between 0 and 1, the population will become extinct. For values of c greater than 1 moving towards 3, the population stabilizes itself on different but distinct values. The scientific world has known this for a very long time.

The mathematicians have, however, discovered that the function stabilizes itself at two alternate values if the control factor c goes beyond the value of 3.2. The function has reached its bifurcation point. If the control factor is forced towards even greater values, new bifurcations emerge until the function expresses chaos. The equation no longer has any distinct values of equilibrium.

The range of the logistic equation is illustrated in Figure 9.

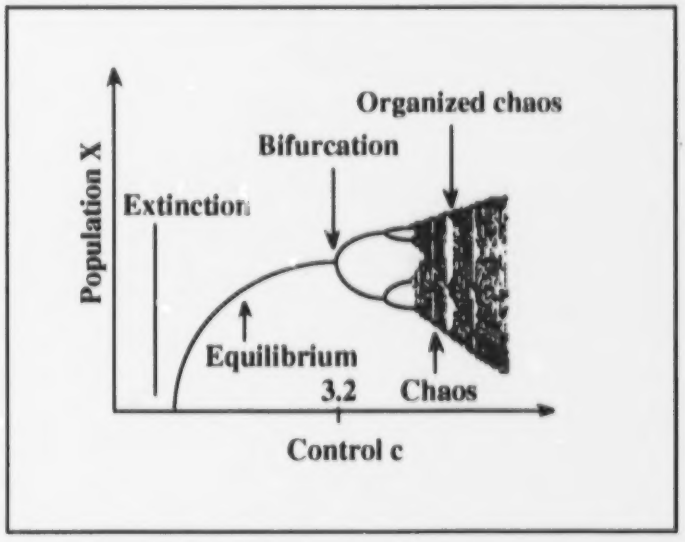

Figure 9. The range of the logistic equation.

For the biologists who know that populations sometimes behave chaotically, it is surprising to see that a minor change in the growth rate could make it impossible to predict next year's population.

Perhaps this model can be used to describe the movements of information. If it can, extinction corresponds to the situation in which only one type of information is moved because the other type of information is outmanoeuvred, so to speak. The network can also stabilize itself into a 'two party' system in which the two types of information confront each other as stable states. The next possibility is bifurcation, which means that the difference of opinion shifts between two, four and eight states or the network can run into an unpredictable chaos, in which nobody can predict how the network will look the following moment.

Naturally, the model does not illustrate why the different possibilities exist. Networking can be described in time and space, but it is, in any case, impossible to use this model to describe why, for example, the growth rate changes.

The example may not be important, but what is important is that it is possible to describe networking as following a deterministic rule, because this shows that the network can be described as stable, even if it is unpredictable. The state of the network may be sensitive to the starting conditions in a way that makes it impossible to predict the subsequent state of the network.

It would make sense, of course, to ask whether the example is meaningful. This is, however, an empirical and not a theoretical question. But whether or not networking conveys meaning to the model, it is important that the example can be constructed, because it shows that the discontinuity theory is able to answer questions of the super singular based on complexity theory. This is important, because in complexity theory, no conflicts exist between the singular and the super singular[2]. In utilizing complexity theory, it is possible to model the minor and the major without claiming the existence of a determining relation between the super singular and the singular. It can still be stated that the major follows some rules, but it is not possible to claim that the major determines the minor. No *relation* exists between the singular and the super singular, only non-linear connections.

The next example concerns the transference of things. The most common thing in modern society is presumably value in the form of money. Values apparently unfold as a smooth flow in the network, but if we look more closely, it can be observed that values converge towards specific nodes as if these nodes were attractors, banks for example. The size and positions of the different attractors, however, are not stable. Some attractors appear and grow at different positions in the network, and others just disappear. The attractors apparently behave like atmospheric pressure areas. I think the flow of values might be modelled as pressure-gradient and whirls, and that the meteorology which builds upon complexity theories is worth considering in the search for models of the 'super singular'.

It is my opinion that economics as described in Elstrup Rasmussen [1994] is mesmerized by the supply-demand model that claims that the market place is never far from equilibrium. It would be worthwhile to think of the market as if it behaves as the weather does or to explore the logistic equation claiming that the market is stable under some circumstances, while it behaves chaotically under other circumstances.

It is naturally necessary to ask whether a different form of modelling is any help to economics. It is difficult to answer this question, especially for someone who is no expert. But I think it would be sensible to consider, for example, whether it is possible to model the phenomenon of value evaporation, which is inexplicable in classic economics, as energy dissipation [Prigogine & Stengers, 1985]. According to classic economics, values cannot disappear into thin air, while it would be quite obvious in a model based on complexity driven theory to conceive values as dissipating because of the reorganization of the market place far from equilibrium. According to classic economics, values are something that companies or entrepreneurs create and own in the form of property. In economics based on complexity theory, the company and the entrepreneur, respectively, would be conceived of as ways in which the value flow is systematized.

The only purpose of these illustrations has been to show that certain possibilities exist in letting the modern complexity theories inspire the conceptualization of the so called super singular. The major might follow some rules at a higher level of generalization, but the major does not determine the minor.

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[2] The problem of the relation between the singular and the super singular is discussed in Elstrup Rasmussen [1994].

The degree of freedom: correlation

In Elstrup Rasmussen [1994], it was emphasized that the classic theories agreed on the idea that social interaction gives rise to the general. This I do not question, but I do not accept that the general becomes some super singular form of control. I also think that the search for the natural lawfulness of the super singular control forms that determine the singular has had the unfavourable result that the conceptualization of the uncontrolled social existence has been neglected. The theories that have been developed in the endeavour to conceptualize human existence are theories of control based on analytic and dialectic logic. Such theories can, of course, describe the control processes, but they cannot, in my opinion, describe the simple interaction in which the natural language emerges. What the classic theories miss is the creation of a coherent set of concepts that can describe the local development and use of natural language. By that, I have not claimed that a theory which is able to describe the emergence of natural language is without logic, but only that this logic must be different from that of the control theories, and that the logic of the control theories cannot describe the development and use of natural language. Concurrently, I claim that natural language is an immanent quality of human existence and not an abstraction which is suspended above this existence.

Identifying and identity

The process of objective which is determined by the correlation prerequisite can be described as shown in Figure 10 using information as an example. Figuratively, the matrix expresses that two network nodes transmit the same message to each other. In the encounter, something new emerges. When the a'-category encounters 'itself', the identity of a'-category and the a'-category, which is noted a'a'$^{\#}$-identity, emerges. The matrix expresses the way in which information which is determined by the correlation prerequisite develops.

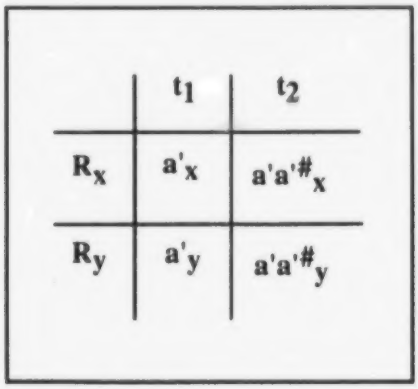

Figure 10. The development of the a'-category into a'a'$^{\#}$-identity.

In order to describe the fundamental theory of the matrix, it is necessary to divide the analysis into the emergence of identity and iteration. The split implies that the movement of the a'-category is ignored while the emergence of a'a'$^{\#}$-identity is in focus.

The problem of identity encompasses the classic question of whether it is possible at all to claim that something: the first a'-category, is identical to something else: the second a'-category. The assertion of identity which is normally expressed by the equation a'=a' is, given the time-space prerequisite, an absurdity, because the a'-category to the left of the equal-sign can never be identical to the a'-category to the right of the equal-sign, as the two categories are dimensioned as being either to the left or to the right.

The second order catastrophe shown in Figure 3 renders the problem visible. If the first and the second a'-category that are noted a and o in the model are to be identical, they must move towards the bifurcation point, but, as soon as they reach the bifurcation point, they no longer exist as the first and the second a'-category, respectively. If they are to exist, they have to emerge from the bifurcation point, but then it is impossible to claim that they are identical. It is only possible to state that the time or space displaced categories can emerge from or be reversed to some unbifurcated state. It is impossible to claim that they are identical across the distance.

It is thus impossible to solve the problem logically within the time-space prerequisite. But even if the problem cannot be solved logically within the given prerequisites, it can be solved if another degree of freedom is added

The added degree of freedom is, of course, development. Because of development, the time and the space distances can be negated *without* the categories returning to the unbifurcated state. This process, the *negation*, has been modelled as a third order catastrophe. The third order catastrophe model shows that the negation of the distance between categories takes place without these categories returning to the unbifurcated state, but the model is not able to describe the emerging identity.

The *negation of the negation* has so far been qualified exclusively as canalization. Canalization, however, does not encompass identity. It is not sufficient to be able to move categories to and fro in space and time if categories are to be identified. If identity is to exist, development must be claimed to be something different from canalization.

As stated earlier, I call this second developmental prerequisite, *correlation*. Correlation emerges as identity, which means that the agent that identifies the a'-category with the a'-category posits the objective as a'a'$^{\#}$-identity. This model of human existence shows that it is impossible in any final sense to determine whether something is identical to something else, but the correlation prerequisite determines the agent as identifying identity of objective. Identity is something that exists as identifying. Identity can be expressed in the classic sentence a rose is a rose is a rose ..., which expresses the infinite nature of identifying.

Human existence subsisting as correlation modelled by a fourth order catastrophe

The fourth order catastrophe is called the butterfly catastrophe, because, under certain circumstances, the projection of the surface of objective onto the agent surface resembles one.

The butterfly catastrophe is a swallowtail catastrophe with an extra control dimension: identifying, added. Because of the added control dimension, the agent surface becomes four-dimensional and the surface of objective five-dimensional. This type of catastrophe is quite impossible to illustrate. If, however, the attention dimension is kept constant in such a manner that the one and the other a'-category exist, and the intention dimension is kept constant in such a manner that development does occur, then the fourth order catastrophe can be illustrated as shown in Figure 11.

In the swallowtail catastrophe, the added dimension creates a third stable state, a'a'$^{\#}$-identity, besides the already existing stable states. The new stable state which is called the intermediate layer, represents a state of compromise between two extremes [Woodcock & Davis, 1979].

Figure 11 sets out that, given development, which means that the a'$\Leftrightarrow$a'-orientation becomes the a'$\succ\prec$a'-instant, the two categories transgress the edges if correlation determines the process. The two categories are not destroyed in the a'$\succ\prec$a'-instant: instead, they are negated onto the intermediate layer or compromise, a'a'$^{\#}$-identity. Because of the prerequisite correlation a new stable state emerges from the a'$\succ\prec$a'-instant.

The complicated movement modelled by the fourth order catastrophe is the agent identifying the identity of objective.

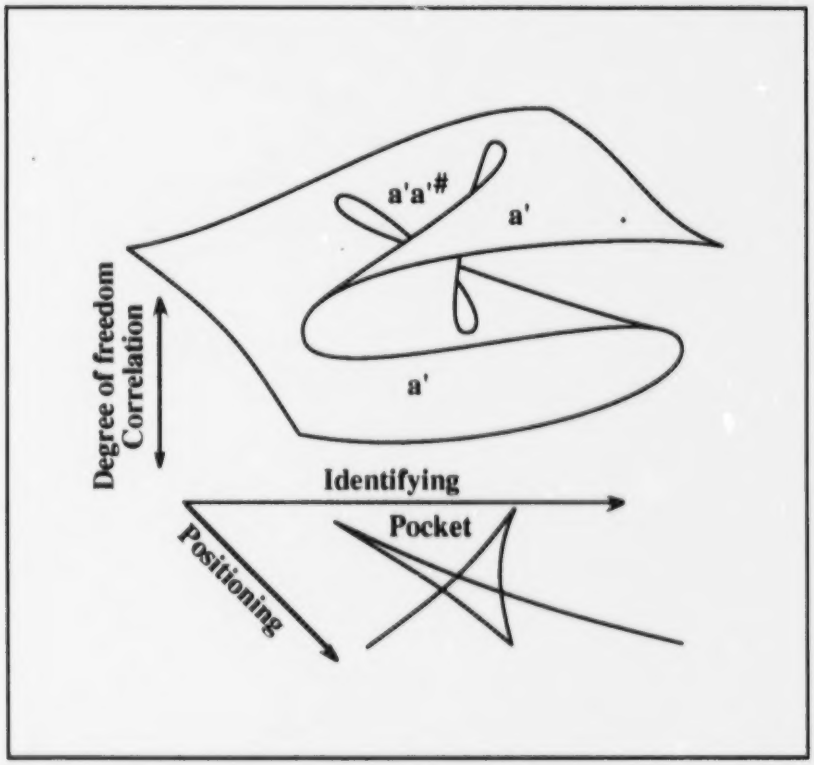

Figure 11. The (AaO) unit described as a fourth order catastrophe.

Analytic schematizing

The developmental degrees of freedom, canalization and correlation, determine the agent as dimensioning and identifying, corresponding to relativity and identity of objective. The context-agent which is determined by self-reference is called schematizing. The canalization form of schematizing is, as noted above, called perspective schematizing; the correlation form is called *analytic schematizing*.

Analytic schematizing is the implicate order of the (Aa(AaO)) unit that encompasses the context-agent positing that the agent identifies that the first a'-category and the second a'-category are identical. The context-agent thus forms analytic statements which claim that something is identical to something else, given someone who identifies. Figuratively, the context-agent posits the agent as a pair of scales which determines that one side of the scale is equal to the other.

The context-agent of the (Aa(AaO)) unit thus posits the (AaO) unit in such a way that it can be shown that the objective: the first and the second a'-category that appear in different places in time and space, are identical because of the identifying agent. I call the *singular analytic schematizing*, that is the singular analytic statement existing in time and space, a *concept*.

Concepts

Identifying is an infinite process. The concept, however, is a momentarily finite process which encompasses the categories that are identified. This means that none of the categories being identified disappear: they are embedded in the concept. Because of the distance, the categories still exist as different from each other, which is noted {a'≠a'}. The categories exist in time and space, but, as they are also identified because of the correlation prerequisite, the concept encompasses identifying as identity, which is noted {a'=a' in a'a'#}. The expression shows that, because of identifying, the a'-category is identical to

the a'-category. The concept is not only identifying as such, but an order of categories made possible by identifying. The time-space prerequisite does not in itself allow for order. It is the correlation prerequisite which makes the order of time and space possible.

In the same way as the context-agent is able to *perspectivize* the (AaO) unit because of the canalization prerequisite, the context-agent, because of the correlation, is the prerequisite able to *systematize* the (AaO) unit in the form of a concept. Systematizing is realized in the form of concepts, that is, in the form of the analytic statements.

The concept is naturally something in itself that exists in time and space, which means that the concept is a category, like thing and information. The concept appears in time and space as a bounded order noted {a',a',a'≠a',a'=a' in a'a'#}. The expression is read: the concept {a',a',a'≠a',a'=a' in a'a'#} implies that the a'-category and the a'-category exist as independent and different information (a'≠a') that is identical because of identifying {a'=a' in a'a'#}. The concept is prototypical. It is not a class but a specific order.

In the description of the implicate order of the (Aa(AaO)) unit determined by correlation, I have used the a'-category as an example. Within the discontinuity theory, however, things and information follow the same fundamental procedures, which means that a concept can be expressed by the forms {a,a,a≠a,a=a in aa#} and {a,a',a≠a',a=a' in a'a#}. The first form systematizes things unambiguously, while the second systematizes thing and information.

The last form {a,a',a≠a',a=a' in a'a#} which expresses that thing and information are identical because of identifying is especially interesting as it is this concept which unites what could only be conceptualized as a reflection in time and space. As described above in Figure 4, the unstable state a'-designation and the stable state a-designation exist, but they are not connected in an order. Because of correlation, the thing-category and the information-category are united in the prototypic concept in such a manner that it can be said that a thing is able to leave behind its own track of information when transferred if it is transferred as a concept.

Identifying dissimilar categories

The most common example of identifying dissimilar categories is the process of buying and selling, that is, trade in the market place by simple exchange of commodities.

Because of the exchange, the commodities are distributed in the network in a new manner. Things and information change position in the network following the rules that are determined by canalization. The only difference between *movements* determined by canalization and correlation, respectively, is that the built-in reciprocity of correlation determines that the categories move in opposite directions.

Because of the exchange in the market place, a sack of potatoes and a chair, for example, change places in the network, but in the same process they are identified and systematized in the concept of commodity. The farmer exchanges his potatoes as a commodity with the carpenter's chair, which is also a commodity.

The matrix in Figure 12 sets out this 'meeting'. The category qualifying the x-capacity at the moment t_1 is the a-category, while the category qualifying the y-capacity is the o-category. Given the correlation prerequisite, the a-category and the o-category are identified, because of which the state of the x-capacity as well as the y-capacity, at the moment t_2 is the identity of the a-category and o-category, that is, the ao#-identity. Following the rule of correlation, the prototypic concept that encompasses the a-category and the o-category can be expressed in the formula {a,o,a≠o,a=o in ao#}. If, for example, the a-category is beech and the o-category is oak and the ao#-identity is the identity between oak and beech, then the expression is read: the concept called wood, for example, is the order that encompasses beech and oak, that beech is not oak, that oak is not beech, and that beech is identical to oak in oak-beech. It is thus not the identity which is called wood, but the order of beech and oak, that is, the prototypic concept. The identity, oak-beech is virtually never designated, as the identity is embedded in the concept.

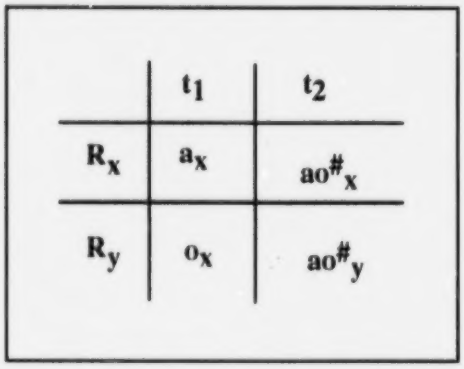

Figure 12 The development of the a-category and the o-category into the $ao^{\#}$-identity.

The only difference between the prototypic concept of the {a,a,a≠a,a=a in $aa^{\#}$} type and the prototypic concept of the {a,o,a≠o,a=o in ao#} type is that the first concept expresses a biunique analytic order (n^{a}), while the second concept expresses a unique analytic order (n^{ao}).

In the example of market place exchange, potatoes and chairs were identified in the concept of commodity. Economists, however, also claim that commodities are identified in the concept of value. If such a statement is going to make sense at all, the categories embedded in the concept of value must be hidden somewhere in the exchange. As the hidden categories cannot be potatoes or chairs as such, because these categories are identified in the concept of commodity, they must be absence-of-potatoes and absence-of-chairs, respectively, because nothing else is left in the exchange. This means that it is orientation of the a-category, that is, the õ-category, and orientation of the o-category, that is, the ã-category, that are identified. It is the absence of potatoes and chairs that is identified in the market place and expressed in the concept of value. So... any concept can be described in terms of absence, that is, {ã,õ,ã≠õ,ã=õ in $ãõ^{\#}$}, which expresses value.

If all concepts are identical in form, as I claim, all concepts must encompass an *order of value* which expresses the existence of absence, and an *order of knowledge* which expresses the existence of subsistence.

It is perhaps not perceived in daily life that any concept encompasses knowledge as well as value, but both sides of the concept exist nevertheless.

Concept iteration

The concepts created because of the correlation prerequisite are, naturally, only flashes in the network. The concept is, figuratively speaking, like a drop of water hitting a stone. At first nothing seems to happen, but the stone is hollowed out if drop upon drop hits the same spot. It is the repetition which creates the lasting expression, that is, the consolidated concept.

If the n^{a}-concept circulates in the network in such a way that the n^{a}-concept is transferred to others who already encompass the concept, the n^{a}-concept is identified with the n^{a}-concept. When the prototype, that is, the n^{a}-concept, is identified with the n^{a}-concept one might think that a meta-concept would emerge, as a meta-meta-concept would emerge from identifying the meta-concept with the meta-concept. I believe, however, that this is not the case. Instead of producing an infinite progress, the concept is *iterated*. This means that the n^{a}-concept is repeated in such a way that the concept deposits itself in itself. In other words, the same order is posited repeatedly as the concept refers to itself, or the same catastrophe repeats itself on top of itself. The iteration process corresponds to the regression of the .....(Aa(Aa(AaO)))).....string that contains no more information

than the (Aa(AaO)) unit. The context-context-agent and the context-context-context-agent, etc. are but expressions of iteration.

The construction of a fractal structure can illustrate the process of concept iteration. I have chosen Smale's horseshoe, shown in Figure 13, as an example of iteration.

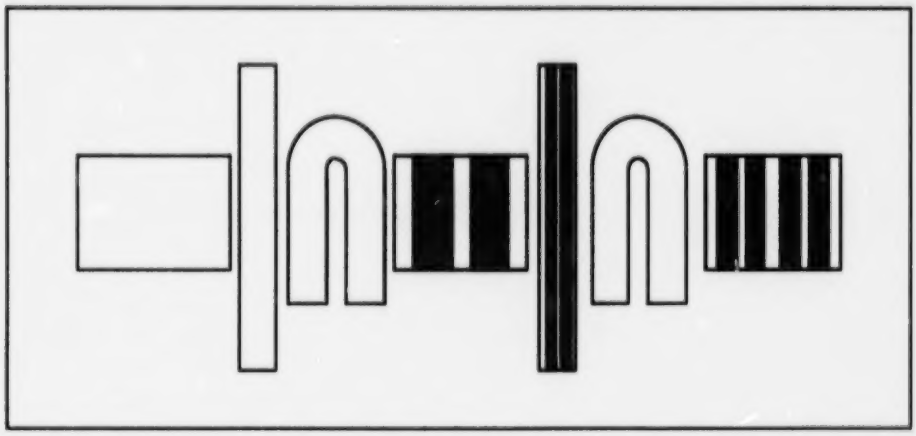

Figure 13. Iteration in the form of Smale's horseshoe.

To construe Smale's horseshoe, the first step is to press a rectangle until it becomes a vertical bar. Then, the bar is folded into the form of a horseshoe. The folded bar is placed within a new rectangle, and after that, the whole process of compressing, folding and putting into a rectangle is repeated [Gleick, 1990].

The model in Figure 13 sets out the way in which layer upon layer is created because of the topological transformation. The topological transformation represents the repetition; the many layers represent the self-similarity of the concept. The rectangle represents the concept which includes its own historic depth.

Smale's horseshoe exists in a fractal dimension between 1 and 2. Smale's horseshoe and other fractals are self-similar, that is, they are symmetrical across scales, which means that, irrespective of the observer's distance, the fractals unfold the same qualities. Or, irrespective of how deeply one moves into the fractal, the same principle of its construction will be detected. Fractals express a specific implicate order that rules very complex phenomena.

My assertion is therefore that networking creates and sustains concepts in the form of fractal structures. According to the discontinuity theory, the concept emerges in the network in the form of an order which is iterated. The concept *exists*, however, in itself in a fractal dimension which is neither the dimension of the network nor a dimension separated from the network. The concept exists as the context-agent that unfolds the implicate order of self-reference. The compressed history of self-reference is the implicate order of the concept which becomes deeper and deeper as time passes.

The emergence of the concepts that exist in the fractal dimension is the closest one can possibly come to a direct perception of the self-reference prerequisite. Self-reference unfolds in the world of concepts, or, in other words: when self-reference unfolds it *speaks* its *natural* language. Self-reference, however, also unfolds as perspective schematizing, which means that the context-agent is able to perpectivize its systematized world. The context-agent is able to *carry into speech* in the form of natural language what the world is and where it is placed.

Mapping the network

The network exists as a countless number of categories, that is, things, information and concepts that form units with greater or lesser probability, that is, they are in a *dynamic* sense closer or farther from each other because of the orientation.

From experience, however, we have the impression that the network is partitioned. Languages, for example, are different because of different concepts, therefore it may be possible to discover some natural regions of the network by means of concepts.

Using the concept as an example, I shall try to demonstrate some of the difficulties associated with the determination of network regions. Culture, which is defined as a set of uniform concepts that continuously form units with greater or lesser probability, represents one type of region. If a number of concepts continuously circulate in a network, a culture is created and sustained. The terms: national culture, organizational culture, group culture, etc., refer to sets of iterating concepts. A culture map appears as a multitude of more or less *dynamic* dense concepts. Taking the singular concept 'horse' as an example, the map of 'horse culture' can be illustrated as shown in Figure 14.

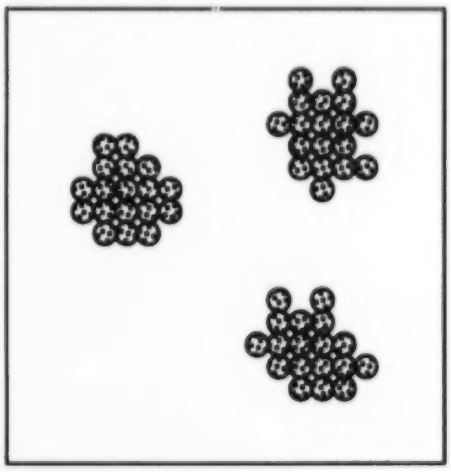

Figure 14. Concepts situated close to or far from each other depending upon the orientation of the concepts.

Figure 14 shows that uniform concepts exist: horse, for example. Because of the orientation, some of the horse concepts are close to each other, while others are separated by a greater distance. However, all of them are from time to time identified with each other. The dense regions in Figure 14 might represent three villages, the inhabitants of which talk about horses every day, and they also talk about horses when they meet their neighbours in the market place. The overall impression would, of course, be more varied, if the singular culture were determined by many different concepts, but to grasp the principles, it is necessary to keep the example simple.

Looking at Figure 14, which represents a small part of the correlation determined 'horse landscape', it seems obvious that three separate 'horse cultures' exist. It is, however, quite arbitrary to claim the existence of three different cultures as the network itself does not point to the shorter distance as the yardstick of mapping. If the yardstick which includes the longer distance is used, only one 'horse culture' exists, that is, the one encompassing all the villages. If the boundary of a culture is determined by the probability of concept iteration, it can encircle anything from a few to all uniform concepts. The greater the utilized yardstick, the fewer the cultures that appear on the map. It is therefore difficult to determine the boundaries of cultures by means of concept orientations. Instead it may be possible to produce a culture map by using the concepts themselves as yardsticks.

The map maker, however, is confronted with a new problem, as the correlation prerequisite determines that concepts are able to systematize other concepts. The cattle concept, for example, can systematize black-and-white cattle and Jersey cattle. Conceptual boundaries therefore exist in the network, but they do not exist at the same level of generalization

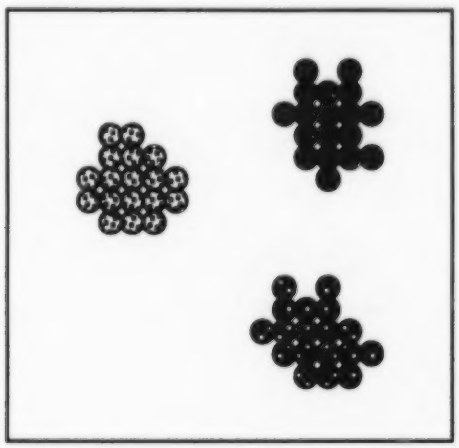

Figure 15. Concepts at a lower level of generalization.

If, for example, the three villages breed three different types of cattle, then the map showing cattle cultures will appear as different regions of dynamic dense concepts as illustrated in Figure 15. At a certain level of analytical schematizing, it seems as if three cultures should exist. The same network will, however, at a higher level of generalization, appear as uniform concepts, as illustrated in Figure 16.

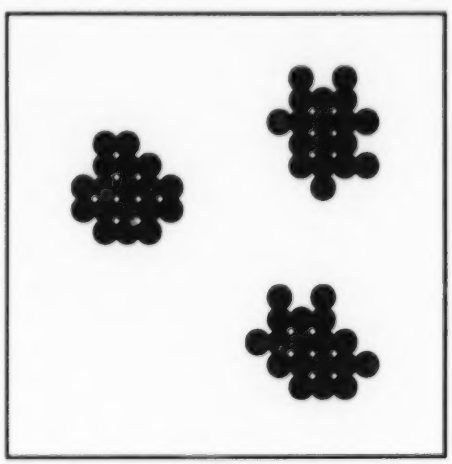

Figure 16. Concepts at a higher level of generalization.

It is very difficult to determine the boundaries of a culture because the concepts can be schematized analytically at different levels of generalization.

When the context-agent posits the network, that is, maps the network using an analytic as well as a perspective yardstick, the map will appear with a specific analytic and perspective depth. If the yardstick changes, the boundaries changes. When, for

instance, we claim to map group culture, organizational culture or national culture, it is not the phenomenon of culture that differs, but the yardstick of the description.

But even if a fixed yardstick is selected, tremendous problems exist in determining whether a concept belongs to a specific culture, as cultures do not have limits because they are attractors determined by order and perspective. Concepts, and by that cultures, are like valleys in a landscape. If a ball is placed on a specific hillside, it will roll to the bottom of the specified valley, but if the ball is placed on the hilltop which constitutes the borderland between the one and the other valley, it cannot be determined in advance which valley it will roll into. The problems can be illustrated as shown in Figure 17.

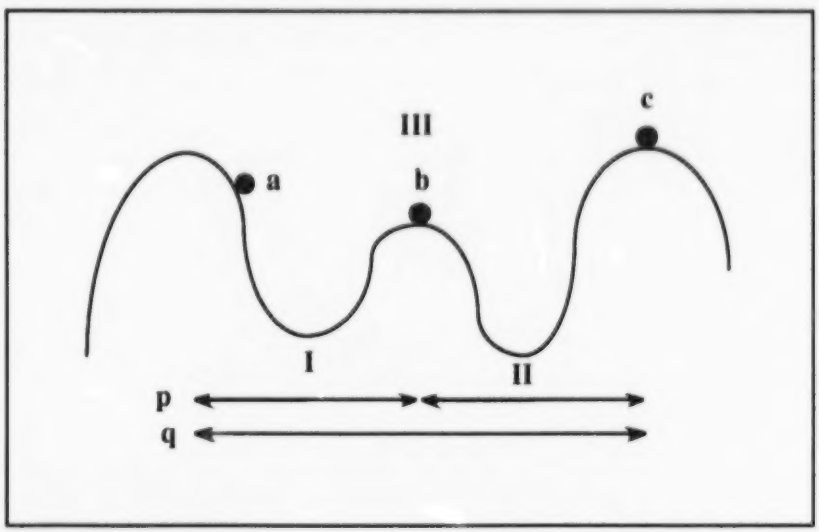

Figure 17. The landscape of cultures.

Figure 17 sets out how different balls, that is, concepts, will behave in relation to different valleys, that is, cultures, when different yardsticks are used in mapping. The a-ball will, if the p-yardstick that symbolizes order as well as perspective is used, roll into valley I. The b-ball will, if the same yardstick is used, roll into valley I or II. It is, however, impossible to predict where it will end up. The behaviour of the balls in the borderland between the two valleys is chaotic. The c-ball will fall into valley II or a valley which is not illustrated.

If the q-yardstick is used, the a-ball will roll into valley III, that encompasses valley I and valley II, and so will the b-ball, no matter whether it ends up in valley I or II. When the q-yardstick is used in map making, the two valleys do not exist any longer for the map maker. The c-ball is still living a chaotic life, but, if an even greater yardstick is used, the c-ball will be included in the same culture as are the a-ball and the b-ball.

The proverb, for instance, which says that 'we can't see the wood for trees' is true, because the yardstick determines what it is that we are indicating. It is impossible to map a wood using a tree-yardstick. Even 10,000 trees do not represent a wood.

Even if it is possible to talk about cultures at different levels of generalization, it is still impossible to determine the boundaries of cultures. But, more important, if anything looks greater than the singular, it is because the mapping takes place by means of a greater yardstick. And the yardstick can be arbitrarily big: it can be global. The ecological statement, for instance, saying that we are all in the same boat sweeps the whole of human existence into the conceptual dustpan in a global movement. That a statement can be global, however, does not imply that the context-agent becomes global. The self-reference is still local. The statement only implies that a map can be produced at an arbitrary level of generalization. It is also important to realize that a map at a higher level of

generalization has to renounce completeness, as the yardstick precludes the possibility of mapping the richness of the details that exist at the lower level of generalization.

This peculiarity of concepts is one of the reasons why it is possible to talk about the same subject, without talking about the same subject. When people communicate they try to find a common conceptual level of generalization that fences off the richness of details that exists at the lower level of generalization. In communication people try to negotiate a yardstick until they reach the same level of generalization. If I, as a townsman, want to communicate with a farmer in a reasonable manner, it will not work if the farmer tries to talk at a low level of generalization. If, for example, the farmer talks about Jersey cattle and black-and-white cattle and my level of generalization is cattle only, then the communication means nothing to me.

The farmer's knowledge, however, is not more concrete than mine, and my knowledge is not more abstract than his. The farmer has, of course, a more elaborated set of concepts as he has more layers in his cattle concept, but I can learn to know these levels during the communication. What the farmer does during a longer conversation is to deny some of my statements about cattle, and, because of that, my cattle concept might bifurcate in such a manner that, for example, the Jersey cattle concept and the black-and-white cattle concept appear, after which the farmer and I can communicate at a lower level of generalization.

The degree of freedom: combination

The last form of development derived from the classic theories, I call combination. Because of combination, human existence is transformed, which means that combination gives rise to novelties in the network. That something is a novelty does not mean that it is the first of its kind in the network, but only that something ceases to exist in order to become something else.

Integrating and entirety

The matrix in Figure 18 shows that the x-capacity encompasses the a-category and that the y-capacity encompasses the o-category at the moment t_1, while the x-capacity encompasses the $oa^{\propto}$-entirety and the y-capacity encompasses the $ao^{\propto}$-entirety at the moment t_2, where $^{\propto}$ indicates that the a-category and the o-category exist as an entirety, which means that the a-category and the o-category are joined in an irreversible manner.

	t_1	t_2
R_x	a_x	$oa^{\propto}{}_x$
R_y	o_y	$ao^{\propto}{}_y$

Figure 18. The development of the a-category and the o-category into the $ao^{\propto}$-entirety

If, for example, the a-category is egg and the o-category is oil, then the ao$^{\propto}$-entirety, which is the same as the oa$^{\propto}$-entirety, corresponds to the egg-oil-entirety.

I call the combination determined objective, *entirety* , and the corresponding agent form, *integrating*.

The manner in which the combination prerequisite as the negation of the negation determines the time-space prerequisite can be described within the second order catastrophe illustrated in Figure 19.

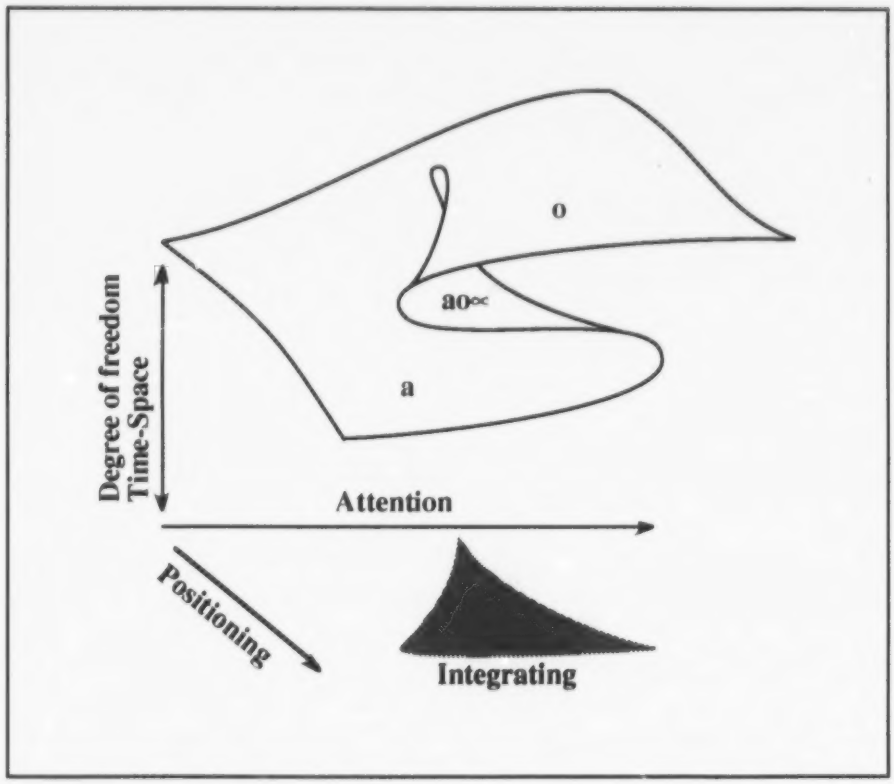

Figure 19. Combination described as a collapse of distance between the a-category and the o-category.

Figure 19 shows that the unstable area that determines the distance between the a-category and the o-category, because of the combination prerequisite becomes something in itself, that is, the ao$^{\propto}$-entirety which is the oa$^{\propto}$-entirety. The agent form that corresponds to the entirety is the cusp in the cusp catastrophe.

The entirety is an unstable state within human existence. It exists in the instant, but it can be something stable within human existence if it becomes the objective of attention and positioning, that is, posited in time and space.

Figuratively, the combination prerequisite binds existing categories which are things, information and concepts, in a new manner, but these novelties can only become stable forms of existence if they are posited as categories, that is, if the agent catches sight of the entirety.

The ao$^{\propto}$-entirety is the a>-<o-instant as a fluctuation that can be caught by the agent attention, positioned and perhaps identified and posited as a concept.

Synthetic schematizing.
I call the manner in which the self-reference prerequisite determines the combination prerequisite *synthetic schematizing*. Synthetic schematizing is the implicate order of the (Aa(AaO)) unit in which the context-agent posits the agent as integrating the objective into an entirety.

In the form of concepts, for example, the context-agent *organizes* the agent in an active relation to the objective in sentences like: Jones cut the bread into slices with a knife. Bread and knife are integrated into the entirety, slices, and Jones, who is the one that cuts, is the integrating agent. The reason that the sentence can be placed in time and space is because perspective schematizing provides the synthetic schematizing, with time and space determining prepositions.

Synthetic schematizing, that is, organizing, can include more layers, as in the sentence: Smith saw that Jones cut the bread into slices with the knife. And it is sentences and systems of sentences of this type that Perspective Text Analysis, which I shall return to in part III, is able to analyse. The PERTEX system models the way in which synthetic schematizing in a perspective manner makes sense of human existence by means of concepts.

Synthetic schematizing is an ongoing instability. It does not reach any form of equilibrium. It starts, it pauses and it ends because of the natural clock of perspectivizing, but it never reaches a stable state.

Analytic knowledge and insight.
The $ao^{\propto}$-entirety is a fluctuation in human existence that can become something stable. The $ao^{\propto}$-entirety of egg and oil, for example, is not mayonnaise. It is only an entirety. If the $ao^{\propto}$-entirety is to be something stable, that is, mayonnaise, it has to come to the attention of the agent. As a designated difference, the entirety can be positioned as a category and, of course, identified and posited as a concept. The entirety is stabilized at the intermediate layer of the fourth order catastrophe as set out by Figure 11, and perhaps posited as a concept. Using the formula of concept formation, the entirety can, as a concept, be denoted $\{ao^{\propto}{\cdot}ao^{\propto}{\cdot}ao^{\propto}{\neq}ao^{\propto},ao^{\propto}{=}ao^{\propto}$ in $ao^{\propto}ao^{\propto\#}\}$. The concept thus encompasses the history of combination. I call the specific order of the entirety which is expressed in the concept, *synthetic insight.*

A concept is a specific order that encompasses identified things, information and concepts and perhaps the identified entirety of things, information and concepts. A concept is analytic *knowledge* which encompasses synthetic *insight.*

It is essential to note that synthetic insight is something which is systematized. It is the context-agent in the form of analytic schematizing that creates synthetic insight. As synthetic schematizing, the context-agent creates the preconditions of synthetic insight, but not the insight itself. Synthetic insight is the manner in which organizing is systematized in the form of this as leading to that.

The located self-reference

The agent of the (AaO) unit can, of course, exist as a category in time and space. When the agent, however, is posited as a category, 'another' agent, which is the 'same' agent must be the agent who posits, but, in doing so, the agent becomes its own context-agent. When the agent posits itself as a category, the self-reference prerequisite emerges as a .....(Aa(Aa(AaO)))..... string located in time and space.

To avoid confusion, the upper agent in the .....(Aa(Aa(AaO)))..... string, is, as noted above, called the context-agent, the middle one is called the agent, and the lower one is called the object-agent. The objective thus encompasses an object-agent and another category. The object-agent and the other category, which is the objective of the object-agent, are dimensioned, identified or integrated by the agent, and perspectivized, systematized and organized by the context-agent.

'Me' and 'self'

If the network is perceived from the position of the object-agent, any other category will exist in a specific dynamic distance from the object-agent. The object-agent, then, is the centre of the network because any other category is the centre of the network. The object-agent can, of course, emerge as things, information or concepts. However, I am only interested in describing the concept form. I am therefore ignoring any one-off affairs or flashes in the network in order to focus on the more stable forms of networking.

At first, the description is restricted in such a way that it only includes the concepts that systematize the categories that are identified and integrated with the *object-agent*. Following the concept formula of analytic schematizing, {a,o,a≠o,a=o in ao#} in which the a-category is the object-agent, the context-agent is the concept which states that the one element of the concept is identical to the object-agent, which is identical to the agent.

In the (Aa(AaO)) unit, the objective therefore encompasses the object-agent, which is identified with something else in such a manner that the context-agent as a concept expresses what the agent is. Or, the (Aa(AaO)) unit continuously produces .....(Aa(Aa(AaO)))..... strings as concepts which systematize the agent as something specific. In other words, the concept formation emerges continuously as *agent* knowledge and *agent* values.

A concept can, however, also systematize entireties, which means that the context-agent in the form of concepts systematizes the entirety of the object-agent and something else that is integrated by the agent itself. The context-agent is, so to speak, able to systematize what the agent does as an object-agent. It is still vital to remember that systematizing is not organizing. When the context-agent systematizes entireties, it puts what the agent can do as an object-agent into order. In doing so, the .....(Aa(Aa(AaO)))..... string continuously emerges as *agent* insight.

If the agent-category is the located centre of networking, it is thus possible to describe the located self-reference as a conceptual order that encompasses agent knowledge, agent insight and agent values. I call the systematized set of concepts that encompasses the agent itself as an object-agent, *'me'*.

'Me' can be described as the concept of everything the agent is and forms part of. 'Me' is the located knowledge, insight and values of the agent itself. 'Me' is the changing but stable form of located self-reference that points to the singular person as someone who knows and values himself in networking.

Still keeping the agent as the centre of analysis, it is possible to point to a wider set of concepts: those that emerge because of 'me' strings. This set of concepts, which I call *'self'*, encompasses everything the located agent identifies, *including* the agent itself. 'Self' encompasses everything that the singular person knows and values, himself included.

'Self' that encompasses 'me' is a systematized set of concepts which is located at a certain position in the network. In many respects, this description of 'self' resembles that of William James, who defines the self as the sum of all that the singular person can call his own [James, 1955]. The concept of sum, however, does not agree with the discontinuity theory, as 'self' in this theory is an ongoing analytic schematizing that posits a specific but variable set of categories as concepts. 'Self', and by that 'me', is not a linear augmentation of concepts, but an ever-changing stability.

The concepts which constitute 'self' can, of course, be identified, which means that 'self' is describable at different levels of generalization. The top level of generalization existing at any time can be described as the *identity* of the singular person. The identity of the person thus is 'self' in the form of a single concept that encompasses descending chains of all the concepts which form part of the process that produces the last or highest concept.

'Self' in the form of concepts is something which emerges as a located order that rules the network. But even though the network is systematized because of 'self', it does not mean that the network is systematized as a whole. Some information and things are

never systematized, but they are nevertheless processed in the network. The entire network can be described as a set of capacities, while the systematized network can be described as a set of selves

'Self' has of course all the same characteristics as any other 'valley' in the network, which means that it is impossible, in any absolute sense, to demarcate one self from another. We cannot claim with any certainty that a category forming part of one self does not simultaneously belong to another self. Some categories belong to more than one self.

Self is network and networking

I claim that it makes no difference whether the (AaO) unit is created within the 'self' boundaries or within any other region of the network. The only difference between 'self' and other major or minor regions of the network, that is cultures, is the yardstick. This proposition may seem strange, because psychology traditionally asserts that the processes of the self are quite different from the so-called social processes. The role theories, for example, state that the roles played by individuals in interpersonal relations are different from the participants, that is, the selves. According to most theories concerning the relation between the singular and the super singular, a qualitative difference exists between the singular person and the super singular institution, economy, society, etc. [3]

The discontinuity theory opposes these conceptions, as it claims that neither the singular nor the super singular determines human existence. Human existence is network and networking, that can be described at different levels of generalization. If, for example, the self-yardstick is used, the network appears as selves, that is, as persons.

Within the boundaries of 'self', the degrees of freedom, correlation, combination and canalization, still govern networking. Being a network, the 'self' concepts are systematized in the form of analytic sentences, organized in the form of synthetic sentence and perspectivized in the form of prepositions. 'Self' thus appears as any other region of the network, not because the person has internalized the network, the information or the concepts, but because the person is the network. When the network is described at a specific level of generalization, only 'selves' emerge on the map.

Using a larger yardstick, human existence may appear as major cultures, that is, groups, institutions, societies, etc. Perhaps other terms are used in describing these forms of human existence, but all forms of networking are fundamentally alike.

This point of view also implies that different forms of minor 'selves', that is, minor cultures, can exist within the major 'self'. 'Self' is 'selves' at different levels of generalization that depend on the yardstick used. Thus, minor contradictory 'selves' can exist side by side within the more generalized boundaries of the major 'self'.

'I' and the discourse

As noted above, 'self' consists of concepts, that is, forms of order that govern the network. I call the schematizing of 'self', 'I'. 'I' is the context-agent that schematizes the 'self' concepts within the boundaries of 'self', which means that 'I' is the perspective, analytic and synthetic schematizing of 'self', that is, of the concepts that constitute 'self'.

Being schematizing, 'I' is the occasion as well as the consequence of 'self' and by that 'me'. When 'I' carries something into speech, that is, conceptualizes, 'I' posits the 'self' concepts in analytic as well as synthetic sentences using prepositions, which means that 'I' systematizes and organizes the 'self' concepts in a perspectivizing manner. And when 'I' carries something into effect, 'I' schematizes 'me', that is, involves 'my-self' as an object-agent.

As analytic schematizing, 'I' continuously discovers and produces order. 'I' is the analytic discourse in which 'self' concepts are systematized as knowledge, insight and value.

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[3] For a more comprehensive description of the relation between the singular and the super singular see Elstrup Rasmussen [1994].

If the analytic discourse is put into perspective, the discourse emerges as a set of stable features that can and will be repeated. I call the perspectivized forms of order, *qualifications*. Qualifications thus correspond to the concept of directed administration discussed in Elstrup Rasmussen [1994].

Qualifications appear as anticipation of possibilities. 'I' can, for example, anticipate trade, as 'I' knows how trade takes place. 'I' has a specific concept of buying, the analytic form of which, in Denmark at least, says that 'I' has to pay whatever the price tag says. As 'I' is qualified in a specific manner, it is very difficult for 'I' to administer the 'self' concepts in a situation in which 'I' has to haggle. As 'I' does not encompass the concepts by which 'I' can carry the situation into speech in a systematized manner, 'I' is not qualified in the situation. Because of that, 'I' has to organize the 'self' concepts instead.

'I' is, as synthetic schematizing, an ongoing discourse in which 'self' is organized. When the organizing of 'self' is put into perspective, the discourse emerges as *competence*. 'I' is competent, when 'I' is able to perspectivize the organized 'self' in a sense making manner, that is, when 'I' creates situational insight. Competence corresponds to the concept of directed innovation discussed in Elstrup Rasmussen [1994].

When 'I' does not encompass an order that can be realized, something which seldom happens in a complex world, 'I' organizes the 'self' concepts in a perspectivizing manner into something that makes sense. The most essential way in which sense making takes place is through synthetic text production. When 'I' creates a synthetic text which follows the form of the .....(Aa(Aa(AaO))).....string, 'I' knits the 'self' concepts together into a whole that makes sense. The text or the discourse organizes in a perspective manner what 'I' intends, which means that the discourse expresses situational competence. 'I' posits 'self' in a competent manner in the form of a discourse. 'I' cannot, of course, be described as anything but a discourse, but, given a method that can analyze a synthetic text, it is possible to produce an image of the implicate order of the located 'I'. In part III, I shall describe such a method, perspective text analysis, which has been developed at the University of Lund.

The major and the minor

Using 'self' as a yardstick 'I' emerges as the qualification to maintain order and the competence to make sense.

Using a major yardstick, qualifications are, for example, the way in which knowledge, insight and values are put together in proverbs, rituals, norms, rules of behaviour, forms of cooperation and models for solving tasks. In contrast, competence is 'the noble art of modelling through'. It represents ways in which human beings act interdependently towards an objective. It represents manners in which synthetic sentences connect in a progression that constantly creates the sense that keeps a multitude of individuals together. The so-called informal structure of organizations is therefore usually an ongoing process of sense making. And it is the competence and the qualification in the form of culture that make up the virtual organization and not the power structure.

Within the discontinuity theory, the foundation of the minor 'I' and 'self' in the form of the person is not in any essential way different from the major society, institution, organization or group. The major is different from the minor because another yardstick is utilized in the determination of its boundaries, but there is no qualitative difference between for instance the fundamental organizational structures and processes and the processes and structures of the person.

When the yardstick is changed from person to group size, for example, which implies that the person disappears from the analysis, the context-agent, that is, 'we' no longer posits 'self', but 'us'. A network analysis must have either 'self' or 'us' as the yardstick. To use both at the same time is impossible. Where the subject of psychology is the singular person, that is, 'I' and 'self', the subject of the social sciences is the social systems, that is 'we' and 'us'. Social psychology is thus a contradiction in terms.

When classic economics, as shown in Part I, simultaneously tries to determine the entrepreneur as a person and as an economic function, the definition falls between two stools. The person neither produces nor fills an economic function. Person and function express the same phenomenon but at different levels of generalization, and, because it is the same fundamental principles that govern any level of generalization, they are similar across the scales.

Consequently, I claim that no relation exists between the minor and the major. The so-called singular is the same as the super singular. The difference does not exist between the personal qualifications and competence and the qualifications and competence of the many, but between the yardsticks which are be utilized in the analysis.

References

Bateson, G. (1972). *Steps to an ecology of mind.* New York: Ballentine Books.

Bohm, D. (1990). *Wholeness and the implicate order.* London: Ark Paperbacks.

Bohr, N. (1964). Den menneskelige erkendelses enhed. (The wholeness of human cognition) In: N. Bohr. *Atomfysik og menneskelig erkendelse. Vol.II.* Copenhagen: Schultz.

Davis, P. (1990). *Det kreative kaos.* (The cosmic blueprint). Copenhagen: Gyldendal.

Elstrup Rasmussen, O. (1994). The discontinuity of human existence. Part I. The fundamental concepts of human existence and the relation between the singular and the super singular. *Cognitive Science Research,* No. 50. Lund University.

Gleick, J. (1990). *Kaos. En ny videnskabs tilbliven.* (Chaos - Making a new Science). Copenhagen. Munksgaard.

Hegel, F. (1972). Wissenschaf der Logik. I: F. Hegel. *Werke (Vols.5&6).* Frankfurt am Main: Suhrkamp Verlag. (Orig.pub. 1812).

James, W. (1950). *The principles of psychology (Vols. I&II).* New York: Dover Publications.

Kant, I. (1975). *Die drei Kritiken in ihrem Zusammenhang mit dem Gesamtwerk.* Stuttgart: Alfred Kröner.

Kierkegaard, S. (1963). Sygdommen til døden. (Illness until death). In: S. Kierkegaard. *Samlede værker.* Copenhagen: Gyldendal.

Lewin, K. (1969). *Grundzüge der Topologischen Psychologie.* Stuttgart: Hans Huber.

Prigogine, I. & Stengers, I. (1985). *Den nye pagt mellem mennesket og unverset.* (La Nouvelle Alliance: Metamorphose de la Science). Aarhus: ASK.

Russell, B. (1919). *Introduction to mathematical philosophy.* London: George Allen & Unwin, Ltd.

Thom, R. (1975). *Structural stability and morphogenesis.* Massachusetts: Benjamin.

Woodcock, A. & Davis, M. (1979). *Catastrophe theory.* New York: Avon Publishers.

Worg, R. (1993). *Deterministisches Chaos. Wege in die nichtlineare Dynamik.* Munich: Wissenschaftsverlag.

Zeeman, E.C. (1976, April). Catastrophe theory. *Scientific American,* 65-82.

Zeeman, E.C. (1977). *Catastrophe theory. Selected papers 1972-1977.* London: Addison-Wesley.